This document gives pertinent information concerning the reissuance of the VPDES Permit listed below. This permit is being processed as a Minor, Municipal permit. The discharge results from the operation of a 0.01 MGD wastewater treatment plant. This permit action consists of updating the proposed effluent limits to reflect the current Virginia WQS (effective January 6, 2011) and updating permit language as appropriate. The effluent limitations and special conditions contained in this permit will maintain the Water Quality Standards of 9VAC25-260-00 et seq.

1. Facility Name and Mailing Address: Emerald Hill Elementary School, 118 West Davis St, Ste 101, Culpeper, Virginia 22701 — SIC Code: 4952 WWTP

   Facility Location: 11245 Rixeyville Road, Culpeper, Virginia 22701 — County: Culpeper

   Facility Contact Name: Jim Hoy — Telephone Number: (540) 727-3409

2. Permit No.: VA0089354 — Expiration Date of previous permit: 1/9/2012

   Other VPDES Permits associated with this facility: None

   Other Permits associated with this facility: None

   E2/E3/E4 Status: Not Applicable

3. Owner Name: County of Culpeper

   Owner Contact/Title: Paul Howard, Director of Environmental Services — Telephone Number: (540) 727-3409

4. Application Complete Date: June 1, 2011

   Permit Drafted By: Alison Thompson — Date Drafted: October 6, 2011

   Draft Permit Reviewed By: Joan Crowther — Date Reviewed: October 14, 2011

   WPM Review By: Bryant Thomas — Date Reviewed: October 25, 2011

   Public Comment Period: Start Date: December 22, 2011 — End Date: January 21, 2012

5. Receiving Waters Information: See Attachment 1 for the Flow Frequency Determination.

Receiving Stream Name:	Muddy Run	Stream Code:	3-MUU
Drainage Area at Outfall:	19.54 sq.mi.	River Mile:	5.10
Stream Basin:	Rappahannock River	Subbasin:	None
Section:	4	Stream Class:	III
Special Standards:	None	Waterbody ID:	VAN-E07R
7Q10 Low Flow:	0.26 MGD	7Q10 High Flow (Jan-May):	3.3 MGD
1Q10 Low Flow:	0.18 MGD	1Q10 High Flow (Jan-May):	2.8 MGD
30Q10 Low Flow:	0.53 MGD	30Q5 Flow:	0.88 MGD
Harmonic Mean Flow:	3.8 MGD	1Q30 Flow:	0.08 MGD
303(d) Listed:	Yes		
TMDL Approved:	Yes	Date TMDL Approved:	7/6/2004 (Bacteria)

6. Statutory or Regulatory Basis for Special Conditions and Effluent Limitations:

- ✓ State Water Control Law
- ✓ Clean Water Act
- ✓ VPDES Permit Regulation
- ✓ EPA NPDES Regulation
- ✓ EPA Guidelines
- ✓ Water Quality Standards
- ___ Other

7. Licensed Operator Requirements: Class III

8. Reliability Class: Class II

9. Permit Characterization:

___	Private	✓	Effluent Limited	___	Possible Interstate Effect
___	Federal	✓	Water Quality Limited	___	Compliance Schedule Required
___	State	___	Toxics Monitoring Program Required	___	Interim Limits in Permit
✓	POTW	___	Pretreatment Program Required	___	Interim Limits in Other Document
✓	TMDL				

10. **Wastewater Sources and Treatment Description:**

This facility is a publicly owned sewage treatment plant which serves one elementary school with a maximum student population of 1,000. The treatment system has a current design flow of 0.01 MGD.

System design consists of a bar screen, with extended aeration basin with activated sludge, followed by filtration and disinfection.

Wastewater first enters the treatment system through the bar screen and then flows to the equalization basin. Wastewater is then pumped to the first of two (2) aeration basins arranged in series and then to the clarifier/settling basin. Secondary sludge may be returned to the aeration basins for additional treatment or wasted to the aerated sludge holding tank. Clarified wastewater then flows through the continuous gravity filter (CGF) which consists of vertical steel tank with sand filter media. Following filtration, wastewater flows to the chlorine contact tank where disinfection is provided via chlorine tablets, followed by dechlorination and post aeration prior to being discharged into Muddy Run.

See Attachment 2 for a facility schematic/diagram.

TABLE 1 – Outfall Description

Outfall Number	Discharge Sources	Treatment	Design Flow	Outfall Latitude and Longitude
001	Domestic Wastewater	See Item 10 above.	0.01 MGD	**38° 32' 38" N** **77° 58' 36" W**
See Attachment 3 for topographic map with facility and outfall locations, Brandy Station Quad - #196C				

11. **Sludge Treatment and Disposal Methods:**

Excess sludge is pumped from the sludge holding tank quarterly and hauled by an independent contractor to the Remington WWTP in Fauquier County.

12. Discharges, Intakes, Monitoring Stations, Other Items in Vicinity of Discharge

TABLE 2	
VAG406151	A small municipal discharge (<1,000 gpd) serving one single family home is located on small an unnamed tributary to Muddy Run. The confluence of the unnamed tributary is more than 2 miles downstream of the Emerald Hill Elementary School discharge.
VAG406399	A small municipal discharge (<1,000 gpd) serving one single family home is located on small an unnamed tributary to Muddy Run. The confluence of the unnamed tributary is more than 2 miles downstream of the Emerald Hill Elementary School discharge.
3-MUU004.98	DEQ Ambient Water Quality Monitoring Station located at the Route 630 Bridge Crossing on Muddy Run. This station is approximately 0.49 rivermiles downstream of the outfall.

13. Material Storage:

TABLE 3 - Material Storage		
Materials Description	Volume Stored	Spill/Stormwater Prevention Measures
Chlorination Tablets	3 – 5 gallon buckets	Stored in covered storage bin inside fenced area with a lock.
Dechlorination Tablets	3 – gallon buckets	Stored in covered storage bin inside fenced area with a lock.
Soda Ash	4-6 – 50 lb. bags	Stored in storage closet adjoining the lab building.

14. Site Inspection:

Performed by DEQ-Compliance staff on January 30, 2008 (see Attachment 4).

15. Receiving Stream Water Quality and Water Quality Standards:

a) Ambient Water Quality Data

The nearest downstream DEQ monitoring station on Muddy Run is Station 3-MUU004.98, located at the Route 630 bridge crossing. This station is located approximately 0.49 rivermiles downstream from the Outfall of VA0089354. The following is a monitoring summary for this portion of Muddy Run, as taken from the 2010 Integrated Assessment:

DEQ has special study monitoring stations on Muddy Run: 3-MUU000.82, at Route 625, and 3-MUU004.98, at Route 630.

E. coli monitoring finds a bacterial impairment, resulting in an impaired classification for the recreation use. A bacteria TMDL for the Muddy Run watershed has been completed and approved. The aquatic life use is considered fully supporting. The fish consumption use was not assessed.

While there is no current data in the 2010 cycle to assess the wildlife use, the fully supporting designation for the wildlife use will be carried forward from the 2008 assessment. According to Rule 8 of the 2010 Assessment Guidance Manual (07-2010), "fully supporting waters can only be carried forward as fully supporting for two additional reporting cycles with no new data." 2010 is the first cycle the fully supporting wildlife assessment is carried forward.

The full planning statement can be found in the reissuance file.

b) Receiving Stream Water Quality Criteria

Part IX of 9VAC25-260(360-550) designates classes and special standards applicable to defined Virginia river basins and sections. The receiving stream Muddy Run is located within Section 4 of the Rappahannock River Basin, and classified as a Class III water.

At all times, Class III waters must achieve a dissolved oxygen (D.O.) of 4.0 mg/L or greater, a daily average D.O. of 5.0 mg/L or greater, a temperature that does not exceed 32°C, and maintain a pH of 6.0-9.0 standard units (S.U.).

Attachment 5 details other water quality criteria applicable to the receiving stream.

Ammonia:
Staff has reviewed the effluent data for pH and temperature and finds no significant differences from the data used to establish ammonia criteria and subsequent effluent limits in the previous permit. Therefore, the previously established effluent pH (90^{th} percentile of 7.5 s.u.) and temperature (90^{th} percentile annual temperature of 24.1°C) and 90^{th} percentile wet season (Jan-May) temperature of 16.3°C values will be carried forward as part of this reissuance process. The data reviewed have been placed in the reissuance file.

DEQ staff performed an analysis using ambient data from January 1, 1990 to February 28, 2011 to determine 90^{th} percentile pH and temperature values by watershed. Watershed VAN-E07R has a 90^{th} percentile annual temperature of 23°C and a 90^{th} percentile wet season (Jan-May) temperature of 16.4°C. The 90^{th} percentile annual pH is 7.5 s.u.

Metals Criteria:
The Water Quality Criteria for some metals are dependent on the receiving stream's hardness (expressed as mg/l calcium carbonate).There is no hardness data for this facility. Staff guidance suggests using a default hardness value of 50 mg/L $CaCO_3$ for streams east of the Blue Ridge. The hardness-dependent metals criteria in Attachment 5 are based on this default value.

Bacteria Criteria:
The Virginia Water Quality Standards at 9VAC25-260-170A state that the following criteria shall apply to protect primary recreational uses in surface waters:

1) *E. coli* bacteria per 100 ml of water shall not exceed a monthly geometric mean of the following:

	Geometric Mean[1]
Freshwater *E. coli* (N/100 ml)	126

[1]For a minimum of four weekly samples [taken during any calendar month].

c) Receiving Stream Special Standards

The State Water Control Board's Water Quality Standards, River Basin Section Tables (9VAC25-260-360, 370 and 380) designates the river basins, sections, classes, and special standards for surface waters of the Commonwealth of Virginia. The receiving stream, Muddy Run, is located within Section 4 of the Rappahannock Basin. This section has been designated with no special standards.

d) Threatened or Endangered Species

The Virginia DGIF Fish and Wildlife Information System Database was searched on October 6, 2011, for records to determine if there are threatened or endangered species in the vicinity of the discharge. No threatened or endangered species were identified. The limits proposed in this draft permit are protective of the Virginia Water Quality Standards and protect any threatened and endangered species that may be found near the discharge.

16. Antidegradation (9VAC25-260-30):

All state surface waters are provided one of three levels of antidegradation protection. For Tier 1 or existing use protection, existing uses of the water body and the water quality to protect these uses must be maintained. Tier 2 water bodies have water quality that is better than the water quality standards. Significant lowering of the water quality of Tier 2 waters is not allowed without an evaluation of the economic and social impacts. Tier 3 water bodies are exceptional waters and are so designated by regulatory amendment. The antidegradation policy prohibits new or expanded discharges into exceptional waters.

The receiving stream has been classified as Tier 2 based on an evaluation of water quality data available prior to the original 1997 permit issuance. While fecal coliform counts were occasionally elevated, other water quality parameters were often better than the established water quality criteria. Elevated fecal coliform counts do not automatically exclude a water body from being rated as Tier 2, based on DEQ guidance. Since 1997, no new information has become available that would indicate otherwise. As such, the current Tier 2 classification for Muddy Run shall remain valid.

No significant degradation to the existing water quality will be allowed. In accordance with current DEQ guidance, no significant lowering of water quality is to occur where permit limits are based on the following:

- The dissolved oxygen in the receiving stream is not lowered more than 0.2 mg/L from the existing levels;
- The pH of the receiving stream is maintained within the range 6.0-9.0 S.U.;
- There is compliance with all temperature criteria applicable to the receiving stream;
- No more than 25% of the unused assimilative capacity is allocated for toxic criteria established for the protection of aquatic life; and
- No more than 10% of the unused assimilative capacity is allocated for criteria for the protection of human health.

The antidegradation policy also prohibits the expansion of mixing zones to Tier 2 waters unless the requirements of 9VAC25-260-30.A.2 are met. The draft permit is not proposing an expansion of the existing mixing zone.

17. Effluent Screening, Wasteload Allocation, and Effluent Limitation Development:

To determine water quality-based effluent limitations for a discharge, the suitability of data must first be determined. Data is suitable for analysis if one or more representative data points is equal to or above the quantification level ("QL") and the data represent the exact pollutant being evaluated.

Next, the appropriate Water Quality Standards are determined for the pollutants in the effluent. Then, the Wasteload Allocations (WLA) are calculated. The WLA values are then compared with available effluent data to determine the need for effluent limitations. Effluent limitations are needed if the 97th percentile of the daily effluent concentration values is greater than the acute wasteload allocation or if the 97th percentile of the four-day average effluent concentration values is greater than the chronic wasteload allocation. Effluent limitations are the calculated on the most limiting WLA, the required sampling frequency, and statistical characteristics of the effluent data.

a) Effluent Screening:
Effluent data were reviewed, and there have been no exceedances of the established limitations. The following pollutants require a wasteload allocation analysis: Ammonia as N and Total Residual Chlorine.

b) Mixing Zones and Wasteload Allocations (WLAs):

Wasteload allocations (WLAs) are calculated for those parameters in the effluent with the reasonable potential to cause an exceedance of water quality criteria. The basic calculation for establishing a WLA is the steady state complete mix equation:

$$WLA = \frac{C_o [Q_e + (f) (Q_s)] - [(C_s) (f) (Q_s)]}{Q_e}$$

Where:
- WLA = Wasteload allocation
- C_o = In-stream water quality criteria
- Q_e = Design flow
- f = Decimal fraction of critical flow from mixing evaluation
- Q_s = Critical receiving stream flow (1Q10 for acute aquatic life criteria; 7Q10 for chronic aquatic life criteria; 30Q10 for ammonia criteria; harmonic mean for carcinogen-human health criteria; and 30Q5 for non-carcinogen human health criteria)
- C_s = Mean background concentration of parameter in the receiving stream.

The Water Quality Standards contain two distinct mixing zone requirements. The first requirement is general in nature and requires the "use of mixing zone concepts in evaluating permit limits for acute and chronic standards in 9VAC25-260-140.B". The second requirement is specific and establishes special restrictions for regulatory mixing zones "established by the Board".

The Department of Environmental Quality uses a simplified mixing model to estimate the amount of mixing of a discharge with the receiving stream within specified acute and chronic exposure periods. The simplified model contains the following assumptions and approximations:

- The effluent enters the stream from the bank, either via a pipe, channel or ditch.
- The effluent velocity isn't significantly greater (no more than 1 - 2 ft/sec greater) than the stream velocity.
- The receiving stream is much wider than its depth (width at least ten times the depth).
- Diffusive mixing in the longitudinal direction (lengthwise) is insignificant compared with advective transport (flow).
- Complete vertical mixing occurs instantaneously at the discharge point. This is assumed since the stream depth is much smaller than the stream width.
- Lateral mixing (across the width) is a linear function of distance downstream.
- The effluent is neutrally buoyant (e.g. the effluent discharge temperature and salinity are not significantly different from the stream's ambient temperature and salinity).
- Complete mix is determined as the point downstream where the variation in concentration is 20% or less across the width and depth of the stream.
- The velocity of passing and drifting organisms is assumed equal to the stream velocity.

If it is suitably demonstrated that a reasonable potential for lethality or chronic impacts within the physical mixing area doesn't exist, then the basic complete mix equation, with 100% of the applicable stream flow, is appropriate. If the mixing analysis determines there is a potential for lethality or chronic impacts within the physical mixing area, then the proportion of stream flow that has mixed with the effluent over the allowed exposure time is used in the basic complete mix equation. As such, the wasteload allocation equation is modified to account for the decimal fraction of critical flow (f).

Staff derived wasteload allocations where parameters are reasonably expected to be present in an effluent (e.g., total residual chlorine where chlorine is used as a means of disinfection) and where effluent data indicate the pollutant is present in the discharge above quantifiable levels. With regard to the Outfall 001 discharge, ammonia as N is likely present since this is a WWTP treating sewage and total residual chlorine may be present since chlorine is used for disinfection. As such, Attachment 5 details the mixing analysis results and WLA derivations for these pollutants.

Antidegradation Wasteload Allocations (AWLAs).

Since the receiving stream has been determined to be a Tier II water, staff must also determine antidegradation wasteload allocations (AWLAs). The steady state complete mix equation is used substituting the antidegradation baseline (C_b) for the in-stream water quality criteria (C_o):

$$AWLA = \frac{C_b (Q_e + Q_s) - (C_s)(Q_s)}{Q_e}$$

Where:
- AWLA = Antidegradation-based wasteload allocation
- C_b = In-stream antidegradation baseline concentration
- Q_e = Design flow
- Q_s = Critical receiving stream flow (1Q10 for acute aquatic life criteria; 7Q10 for chronic aquatic life criteria; 30Q10 for ammonia criteria; harmonic mean for carcinogen-human health criteria; and 30Q5 for non-carcinogen human health criteria)
- C_s = Mean background concentration of parameter in the receiving stream.

Calculated AWLAs for the pollutants noted in b. above are presented in Attachment 5.

c) Effluent Limitations Toxic Pollutants, Outfall 001 –

9VAC25-31-220.D. requires limits be imposed where a discharge has a reasonable potential to cause or contribute to an in-stream excursion of water quality criteria. Those parameters with WLAs and AWLAs that are near effluent concentrations are evaluated for limits.

The VPDES Permit Regulation at 9VAC25-31-230.D. requires that monthly and weekly average limitations be imposed for continuous discharges from POTWs and monthly average and daily maximum limitations be imposed for all other continuous non-POTW discharges.

1) Ammonia as N/TKN:

Staff calculated WLAs for Ammonia as N using current critical flows and mixing allowance. In accordance with current DEQ guidance, staff used a default data point of 9.0 mg/L and the most stringent WLAs to derive limits. Analysis shows that no year round limit is necessary for Ammonia as N (Attachment 6).

The summer TKN limit of 10.0 mg/L is based on modeling conducted during the first permit issuance in 1997, and is adequate to protect the DO criteria and protect against ammonia toxicity. The weekly average limit will be 15.0 mg/L based on a multiplier of 1.5 times the monthly average. No TKN limit is needed in winter due to the large stream flow, and the amount of available dilution. The model outputs can be found in Attachment 7.

2) Total Residual Chlorine:

Chlorine is used for disinfection and is potentially in the discharge. Staff calculated WLAs for TRC using current critical flows and the mixing allowance. In accordance with current DEQ guidance, staff used a default data point of 0.2 mg/L and the calculated WLAs to derive limits. Only the Acute WLA was used since the facility discharges intermittently. A monthly average of 0.004 mg/L and a weekly average limit of 0.005 mg/L are proposed for this discharge (Attachment 6).

d) Effluent Limitations and Monitoring, Outfall 001 – Conventional and Non-Conventional Pollutants

No changes to dissolved oxygen (D.O.), biochemical oxygen demand-5 day (BOD_5), carbonaceous biochemical oxygen demand-5 day ($CBOD_5$), total suspended solids (TSS), total kjeldahl nitrogen (TKN), and pH limitations are proposed.

Dissolved Oxygen, $CBOD_5$ (Jun-Dec), and TKN (June-Dec) limitations are based on the stream modeling conducted in June 1996 (Attachment 7) and are set to ensure that the receiving stream D.O. does not decrease more than 0.2 mg/l to meet the requirements of the antidegradation policy.

It is staff's practice to equate the Total Suspended Solids limits with the BOD_5/$CBOD_5$ limits. TSS limits are established to equal BOD_5 limits since the two pollutants are closely related in terms of treatment of domestic sewage.

pH limitations are set at the water quality criteria.

BOD_5 limitations (Jan-May) are based on 40 CFR Part 133.

E. coli limitations are in accordance with the Water Quality Standards 9VAC25-260-170.

e) Effluent Limitations and Monitoring Summary.

The effluent limitations are presented in the following table. Limits were established for Flow, BOD_5, $CBOD_5$, Total Suspended Solids, TKN, pH, Dissolved Oxygen, and Total Residual Chlorine.

The limit for Total Suspended Solids is based on Best Professional Judgement.

The mass loading (kg/d) for monthly and weekly averages were calculated by multiplying the concentration values (mg/L), with the flow values (in MGD) and a conversion factor of 3.785.

Sample Type and Frequency are in accordance with the recommendations in the VPDES Permit Manual.

$CBOD_5$ limitations (June-December)
The VPDES Permit Regulation at 9VAC25-31-30 and 40 CFR Part 133 require that the facility achieve at least 85% removal for CBOD and TSS (or 65% for equivalent to secondary). The limits in this permit are water-quality-based effluent limits and result in greater than 85% removal.

BOD_5 limitations (January-May)
The VPDES Permit Regulation at 9VAC25-31-30 and 40 CFR Part 133 require that the facility achieve at least 85% removal for BOD and TSS (or 65% for equivalent to secondary). Because this facility was designed to meet the more stringent water-quality based CBOD limitations and has demonstrated >85% removal, no influent BOD and TSS monitoring was included with this reissuance.

18. Antibacksliding:

All limits in this permit are at least as stringent as those previously established. Backsliding does not apply to this reissuance.

19. Effluent Limitations/Monitoring Requirements:

Design flow is 0.01 MGD.

Effective Dates: During the period beginning with the permit's effective date and lasting until the expiration date.

PARAMETER	BASIS FOR LIMITS	DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS	
		Monthly Average	Weekly Average	Minimum	Maximum	Frequency	Sample Type
Flow (MGD)	NA	NL	NA	NA	NL	1/D	Estimate
pH	3	NA	NA	6.0 S.U.	9.0 S.U.	1/D	Grab
BOD_5 (January-May)	1	30 mg/L 1.1 kg/day	45 mg/L 1.7 kg/day	NA	NA	1/M	Grab
$CBOD_5$ (June-December)	3,5	10 mg/L 0.38 kg/day	15 mg/L 0.57 kg/day	NA	NA	1/M	Grab
Total Suspended Solids (TSS) (January-May)	2	30 mg/L 1.1 kg/day	45 mg/L 1.7 kg/day	NA	NA	1/M	Grab
Total Suspended Solids (TSS) (June-December)	2	10 mg/L 0.38 kg/day	15 mg/L 0.57 kg/day	NA	NA	1/M	Grab
Dissolved Oxygen	3	NA	NA	6.0 mg/L	NA	1/D	Grab
Total Kjeldahl Nitrogen (TKN) (June-December)	3,5	10 mg/L 0.38 kg/day	15 mg/L 0.57 kg/day	NA	NA	1/M	Grab
E. coli (Geometric Mean) [(a)(b)]	3	126 n/100mls	NA	NA	NA	1/W	Grab
Total Residual Chlorine (after contact tank)	2, 3, 4	NA	NA	1.0 mg/L	NA	1/D	Grab
Total Residual Chlorine (after dechlorination)	3	0.004 mg/L	0.005 mg/L	NA	NA	1/D	Grab

The basis for the limitations codes are:
1. Federal Effluent Requirements
2. Best Professional Judgement
3. Water Quality Standards
4. DEQ Disinfection Guidance
5. Stream Model- Attachment 7

MGD = Million gallons per day.
NA = Not applicable.
NL = No limit; monitor and report.
S.U. = Standard units.

1/D = Once every day.
1/W = Once every week.
1/M = Once every month.

Grab = An individual sample collected over a period of time not to exceed 15-minutes.

a. Samples shall be collected between 10:00 a.m. and 4:00 p.m.

b. The permittee shall sample and submit *E. coli* results at the frequency of once every week for three (3) months. If all reported results for *E. coli* do not exceed 126 n/100mL, reported as the geometric mean, the permittee may submit a written request to DEQ-NRO for a reduction in the sampling frequency to once per quarter.

Upon approval, the permittee shall collect four (4) samples during one month within each quarterly monitoring period as defined below. The results shall be reported as the geometric mean. The quarterly monitoring periods shall be January through March, April through June, July through September and October through December. The DMR shall be submitted no later than the 10th day of the month following the monitoring period.

Should any of the quarterly monitoring results for *E. coli* exceed 126 n/100mL, reported as the geometric mean, the monitoring frequency shall revert to once per week for the remainder of the permit term.

20. Other Permit Requirements:

a) Part I.B. of the permit contains additional chlorine monitoring requirements, quantification levels and compliance reporting instructions.

These additional chlorine requirements are necessary per the Sewage Collection and Treatment Regulations at 9VAC25-70 and by the Water Quality Standards at 9VAC25-260-170. A minimum chlorine residual must be maintained at the exit of the chlorine contact tank to assure adequate disinfection. No more that 10% of the monthly test results for TRC at the exit of the chlorine contact tank shall be <1.0 mg/L with any TRC <0.6 mg/L considered a system failure. Monitoring at numerous STPs has concluded that a TRC residual of 1.0 mg/L is an adequate indicator of compliance with the *E. coli* criteria. *E. coli* limits are defined in this section as well as monitoring requirements to take effect should an alternate means of disinfection be used.

9VAC25-31-190.L.4.c. requires an arithmetic mean for measurement averaging and 9VAC25-31-220.D. requires limits be imposed where a discharge has a reasonable potential to cause or contribute to an in-stream excursion of water quality criteria. Specific analytical methodologies for toxics are listed in this permit section as well as quantification levels (QLs) necessary to demonstrate compliance with applicable permit limitations or for use in future evaluations to determine if the pollutant has reasonable potential to cause or contribute to a violation. Required averaging methodologies are also specified.

21. Other Special Conditions:

a) 95% Capacity Reopener. The VPDES Permit Regulation at 9VAC25-31-200.B.4. requires all POTWs and PVOTWs develop and submit a plan of action to DEQ when the monthly average influent flow to their sewage treatment plant reaches 95% or more of the design capacity authorized in the permit for each month of any three consecutive month period. This facility is a POTW.

b) Indirect Dischargers. Required by VPDES Permit Regulation, 9VAC25-31-200 B.1. and B.2. for POTWs and PVOTWs that receive waste from someone other than the owner of the treatment works.

c) O&M Manual Requirement. Required by Code of Virginia §62.1-44.19; Sewage Collection and Treatment Regulations, 9VAC25-790; VPDES Permit Regulation, 9VAC25-31-190.E. Within 90 days of the effective date of this permit, the permittee shall submit for approval an Operations and Maintenance (O&M) Manual or a statement confirming the accuracy and completeness of the current O&M Manual to the Department of Environmental Quality, Northern Regional Office (DEQ-NRO). Future changes to the facility must be addressed by the submittal of a revised O&M Manual within 90 days of the changes. Non-compliance with the O&M Manual shall be deemed a violation of the permit.

d) CTC, CTO Requirement. The Code of Virginia § 62.1-44.19; Sewage Collection and Treatment Regulations, 9VAC25-790 requires that all treatment works treating wastewater obtain a Certificate to Construct prior to commencing construction and to obtain a Certificate to Operate prior to commencing operation of the treatment works.

e) Licensed Operator Requirement. The Code of Virginia at §54.1-2300 et seq. and the VPDES Permit Regulation at 9VAC25-31-200 C, and Rules and Regulations for Waterworks and Wastewater Works Operators (18VAC160-20-10 et seq.) requires licensure of operators. This facility requires a Class III operator.

f) Reliability Class. The Sewage Collection and Treatment Regulations at 9VAC25-790 require sewage treatment works to achieve a certain level of reliability in order to protect water quality and public health consequences in the event of component or system failure. Reliability means a measure of the ability of the treatment works to perform its designated function without failure or interruption of service. The facility is required to meet a reliability Class of II.

g) Water Quality Criteria Reopener. The VPDES Permit Regulation at 9VAC25-31-220 D. requires establishment of effluent limitations to ensure attainment/maintenance of receiving stream water quality criteria. Should effluent monitoring indicate the need for any water quality-based limitations, this permit may be modified or alternatively revoked and reissued to incorporate appropriate limitations.

h) Sludge Reopener. The VPDES Permit Regulation at 9VAC25-31-220.C. requires all permits issued to treatment works treating domestic sewage (including sludge-only facilities) include a reopener clause allowing incorporation of any applicable standard for sewage sludge use or disposal promulgated under Section 405(d) of the CWA. The facility includes a sewage treatment works.

i) Sludge Use and Disposal. The VPDES Permit Regulation at 9VAC25-31-100.P; 220.B.2, and 420 through 720, and 40 CFR Part 503 require all treatment works treating domestic sewage to submit information on their sludge use and disposal practices and to meet specified standards for sludge use and disposal. The facility includes a treatment works treating domestic sewage.

Permit Section Part II. Part II of the permit contains standard conditions that appear in all VPDES Permits. In general, these standard conditions address the responsibilities of the permittee, reporting requirements, testing procedures and records retention.

23. Changes to the Permit from the Previously Issued Permit:

a) Special Conditions:
   1) The Water Quality Criteria Reopener was included with this reissuance.

b) Monitoring and Effluent Limitations:
   1) The *E. coli* monitoring was changed from 2/M to 1/W in accordance with the current Water Quality Standards and Agency guidance. The option for monitoring reduction was also included for this monitoring.
   2) The Total Residual Chlorine monthly average and weekly average limitations were revised based on current WLAs and statistical analysis.
   3) All loadings are now expressed as two significant figures per the current agency guidance.

c) Other:
   1) The rivermile was corrected with this reissuance.

24. Variances/Alternate Limits or Conditions:

None

25. Public Notice Information:

First Public Notice Date: 12/22/2011 Second Public Notice Date: 12/29/2011

Public Notice Information is required by 9VAC25-31-280 B. All pertinent information is on file and may be inspected, and copied by contacting the: DEQ Northern Regional Office, 13901 Crown Court, Woodbridge, VA 22193, Telephone No. (703) 583-3834, Alison.Thompson@deq.virginia.gov. See Attachment 8 for a copy of the public notice document.

Persons may comment in writing or by email to the DEQ on the proposed permit action, and may request a public hearing, during the comment period. Comments shall include the name, address, and telephone number of the writer and of all persons represented by the commenter/requester, and shall contain a complete, concise statement of the factual basis for comments. Only those comments received within this period will be considered. The DEQ may decide to hold a public hearing, including another comment period, if public response is significant and there are substantial, disputed issues relevant to the permit. Requests for public hearings shall state 1) the reason why a hearing is requested; 2) a brief, informal statement regarding the nature and extent of the interest of the requester or of those represented by the requester, including how and to what extent such interest would be directly and adversely affected by the permit; and 3) specific references, where possible, to terms and conditions of the permit with suggested revisions. Following the comment period, the Board will make a determination regarding the proposed permit action. This determination will become effective, unless the DEQ grants a public hearing. Due notice of any public hearing will be given. The public may request an electronic copy of the draft permit and fact sheet or review the draft permit and application at the DEQ Northern Regional Office by appointment.

26. 303 (d) Listed Stream Segments and Total Max. Daily Loads (TMDL):
Sufficient excursions from the maximum *E. coli* bacteria criterion (6 of 11 samples - 54.5%) were recorded at DEQ's ambient water quality monitoring station (3-MUU000.82) at the Route 625 crossing and (6 of 12 samples - 50.0%) were recorded at DEQ's ambient water quality monitoring station (3-MUU004.98) at the Route 630 crossing to assess this stream segment as not supporting of the recreation use goal for the 2010 water quality assessment. The Bacteria TMDL was approved on July 6, 2004 and the facility was given a WLA of **1.74E+10 cfu/year** of *E. coli* bacteria.

TMDL Reopener: This special condition is to allow the permit to reopened if necessary to bring it in compliance with any applicable TMDL that may be developed and approved for the receiving stream.

27. Additional Comments:
Previous Board Action(s): None.

Staff Comments: None.

Public Comment: None.

EPA Checklist: The checklist can be found in Attachment 9.

Attachments to the Fact Sheet for VA0089354 Emerald Hill Elementary School WWTP

Attachment 1	Flow Frequency Determination
Attachment 2	Facility Diagram
Attachment 3	Topographic Map
Attachment 4	DEQ-Compliance Technical Inspection
Attachment 5	MSTRANTI
Attachment 6	Statistical Analysis for Effluent Limitations
Attachment 7	Dissolved Oxygen Model
Attachment 8	Public Notice
Attachment 9	EPA Checklist

Flow Frequency Determination - Muddy Run
Based on Hazel River Flow Data

SITEID	NAME	Drainage Area	Harmonic Mean	High Flow 7Q10	High Flow 1Q10	30Q5	7Q10	1Q10	30Q10*	1Q30	
01663500	Hazel River @ Rixeyville, Va.	*287*	*87*	*75*	*64*	*20*	*5.9*	*4*	*12*	*1.8*	*cfs*
	Muddy Run @ Emerald Hill Elementary School (Drainage Area Comparison based on data from 1942 - 1992, 2001 - 2003)	19.54	**5.923**	**5.106**	**4.357**	**1.362**	**0.402**	**0.272**	**0.817**	**0.123**	**cfs**
			3.826	**3.299**	**2.815**	**0.880**	**0.259**	**0.176**	**0.528**	**0.079**	**mgd**

Attachment 1

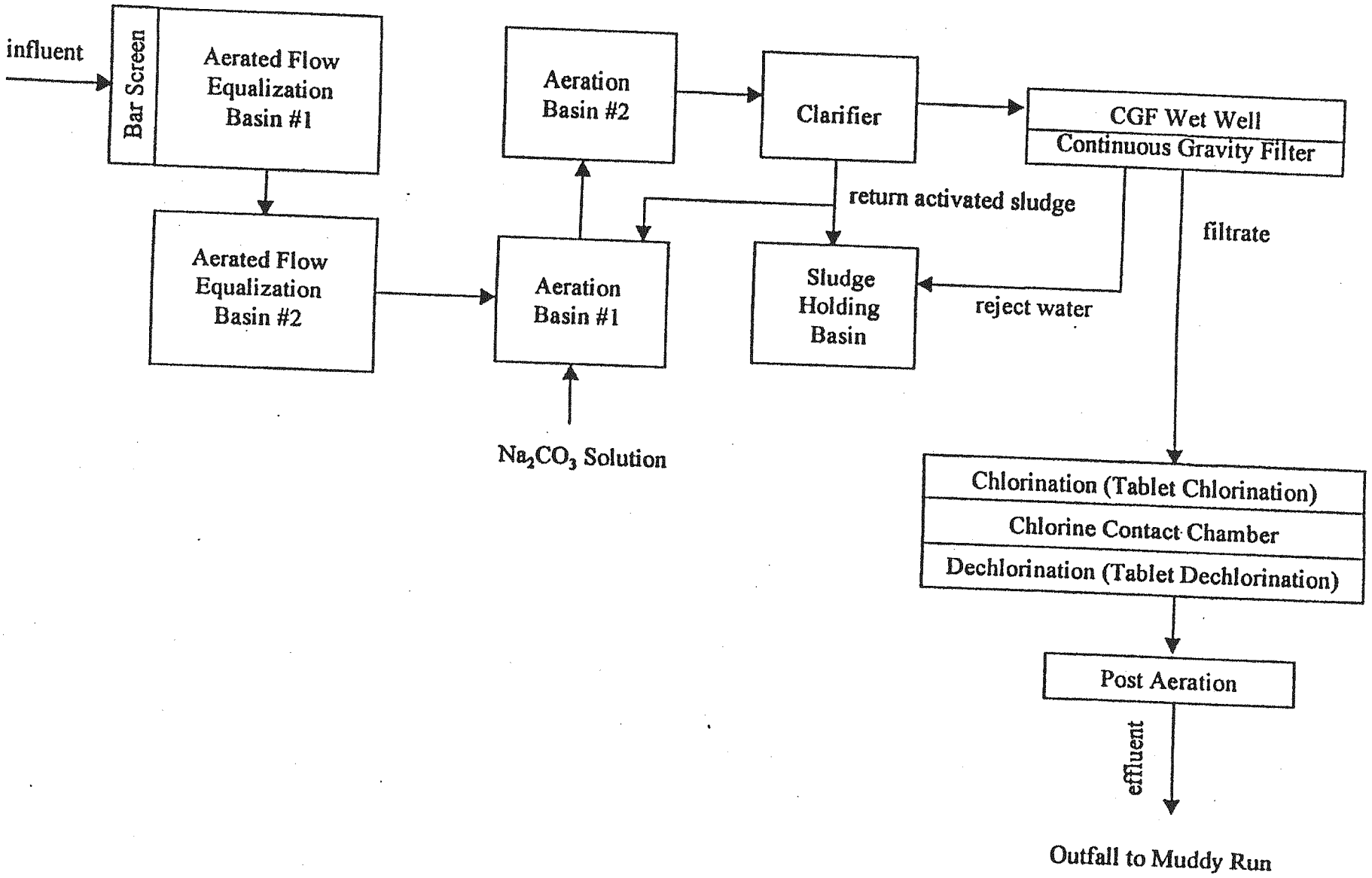
High Flow 30Q10 = 104 cfs for Hazel River

$$\frac{104}{287} = \frac{x}{19.54}$$

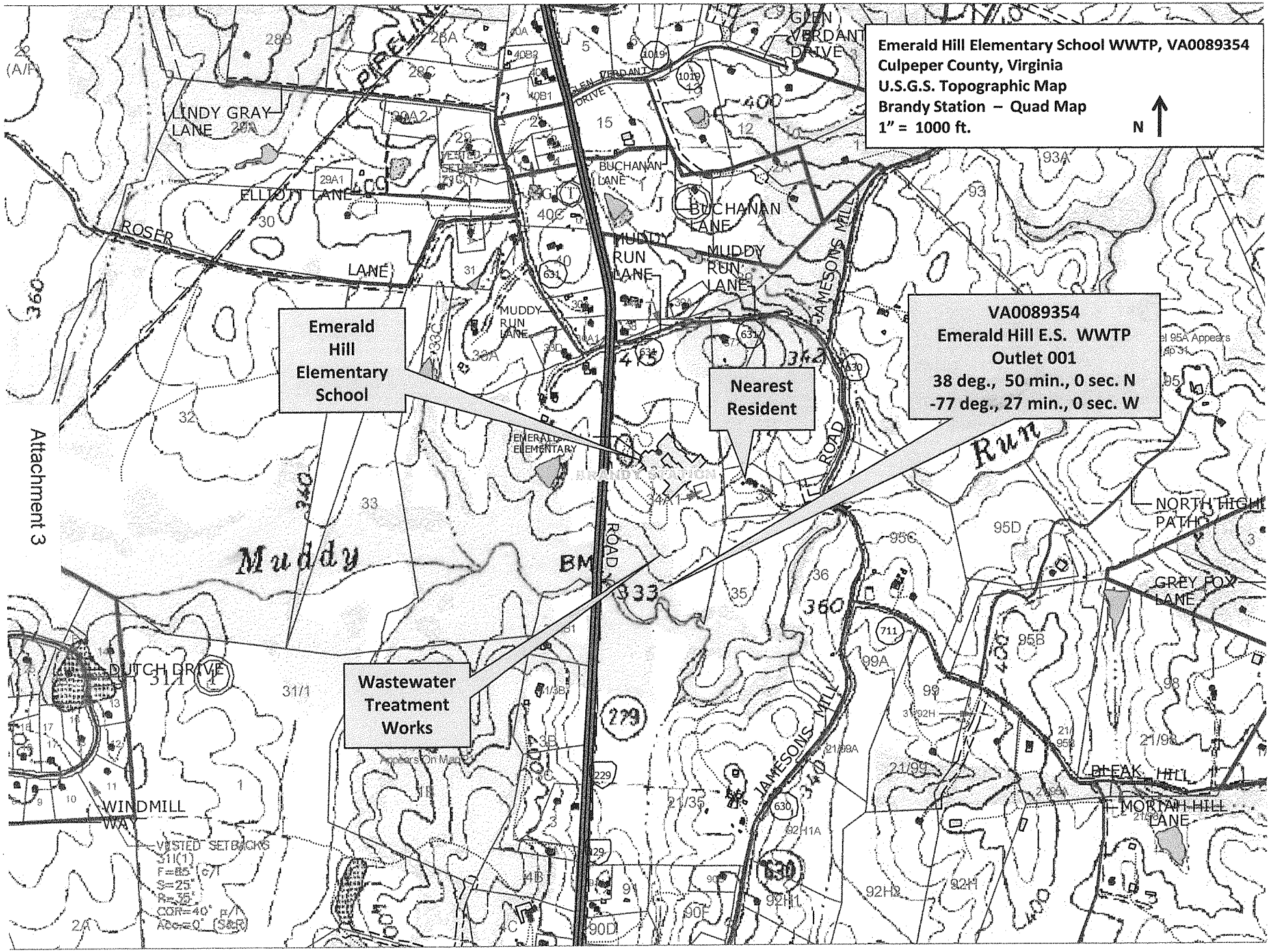
$x = 7.08$ cfs

$x = 4.6$ MGD

Flow Diagram of Emerald Hill Elementary School WWTP



Attachment 2



Attachment 3

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY
NORTHERN REGIONAL OFFICE
13901 Crown Court, Woodbridge, Virginia 22193
(703) 583-3800 Fax (703) 583-3801
www.deq.virginia.gov

Preston Bryant
Secretary of Natural Resources

David K. Paylor
Director

Thomas A. Faha
Regional Director

February 25, 2008

Mr. Paul Howard
Director of Environmental Services
Culpeper County
306 North Main Street
Culpeper, VA 22701

Re: Emerald Hill Elementary School Sewage Treatment Plant Inspection, Permit VA0089354

Dear Mr. Howard:

Enclosed are copies of the facility technical and laboratory inspection reports generated from observations made while performing a Facility Technical Inspection at Emerald Hill Elementary School - Sewage Treatment Plant (STP) on January 30, 2008. The compliance staff would like to thank Mr. Jonathon Weekly for his time and assistance during the inspection.

Summaries for both the technical and laboratory inspections are enclosed. The facility had Deficiencies for the laboratory inspection for Laboratory Equipment, pH and Total Residual Chlorine. Please submit in writing a progress report to this office by **March 25, 2008** for the items addressed in the summary. Your response may be sent either via the US Postal Service or electronically, via E-mail. If you chose to send your response electronically, we recommend sending it as an Acrobat PDF or in a Word-compatible, write-protected format.

If you have any questions or comments concerning this report, please feel free to contact me at the Northern Regional Office at (703) 583-3909 or by E-mail at wgharback@deq.virginia.gov.

Sincerely,

Wilamena Harback

Wilamena Harback
Environmental Specialist II

cc: Permits / DMR File
Compliance Manager
Compliance Auditor
Compliance Inspector
OWPC (Steve Stell)

Summary of conditions from last inspection
(May 25, 2006)

Problem identified		Corrected	Not Corrected
1.	Foam sprayer needs repair.	[X]	[ ]
2.	Flush and clean the media.	[X]	[ ]
3.	Add extension pipe to correct the scum pooling.	[X]	[ ]
4.	Repair or replace the backflow preventer.	[X]	[ ]

Summary of conditions for current inspection

Comments:

- The facility recently installed a new filtration system as part of their consent order.
- The facility should be commended on the overall appearance. The treatment works and the in-house operator laboratory was in good condition.

DEQ
WASTEWATER FACILITY INSPECTION REPORT
PREFACE

VPDES/State Certification No.	(RE) Issuance Date	Amendment Date	Expiration Date
VA0089354	**01/10/07**		**01/09/12**

Facility Name	Address	Telephone Number
Emerald Hill Sewage Treatment Plant (STP)	**11245 Rixeyville Road Culpeper, VA 22701**	**(540) 937-6517**
Owner Name	Address	Telephone Number
Culpeper County Public Schools	**450 Radio Lane Culpeper, VA 22701**	**(540) 825-3677**
Responsible Official	Title	Telephone Number
Mr. Paul Howard	**Director of Environmental Services**	**(540) 727-3409**
Responsible Operator	Operator Cert. Class/number	Telephone Number
Mr. Jonathon Weekly	**Class III / 1911-004504**	**(540) 727-3409**

TYPE OF FACILITY:

DOMESTIC				**INDUSTRIAL**			
Federal		Major		Major		Primary	
Non-federal	**X**	Minor	**X**	Minor		Secondary	

INFLUENT CHARACTERISTICS:	DESIGN:
Flow	**NL**
Population Served	**1,000**
Connections Served	**1 - School**
BOD_5	**Unknown**
TSS	**Unknown**

EFFLUENT LIMITS: (mg/L unless specified)

Parameter	Min.	Avg.	Max.	Parameter	Min.	Avg.	Max.
Flow (MGD)		**0.01**	**NL**	**TSS (Jan-May)**		**30**	**45**
pH (SU)	**6.0**		**9.0**	**TSS (Jun-Dec)**		**10**	**15**
DO	**6.0**			**$CBOD_5$ (Jun-Dec)**		**10**	**15**
E. Coli (n/CMLI)		**126**		**BOD_5 (Jan-May)**		**30.0**	**45.0**
TRC Total Contact	**1.0**			**TKN (Jun-Dec)**		**10**	**15**
TRC Inst Res Max		**0.04**	**0.05**				

Receiving Stream	**Muddy Run**
Basin	**Rappahannock River**
Discharge Point (LAT)	**38° 50' 00" N**
Discharge Point (LONG)	**77° 27' 00" W**

VPDES NO. **VA0089354**

REV 5/00

DEQ
WASTEWATER FACILITY
INSPECTION REPORT
PART 1

Inspection date: **January 30, 2008**

Date form completed: **February 25, 2008**

Inspection by: **Wilamena Harback**

Inspection agency: **DEQ NRO**

Time spent: **35 hrs**

Announced: **No**

Reviewed by:

Scheduled: **Yes**

Present at inspection: **Stephanie Bellotti and Joan Crowther – DEQ**
Jonathon Weekly – Culpeper County (Emerald Hill Elementary School STP)

TYPE OF FACILITY:

	Domestic	**Industrial**	
[ ] Federal	[ ] Major	[ ] Major	[ ] Primary
[**X**] Nonfederal	[**X**] Minor	[ ] Minor	[ ] Secondary

Type of inspection:

[**X**] Routine
[ ] Compliance/Assistance/Complaint
[ ] Reinspection

Date of last inspection: **May 25, 2006**
Agency: **DEQ NRO**

Population served: approx. **1,000**

Connections served: approx. **1**

Last month average: (Influent): **Not Tested**

Last month average: (Effluent) **December 2007**:

Flow:	**0.007**	**MGD**	pH	**7.6**	**S.U.**	DO	**10.5**	**mg/L**
TSS, Jan.- May	**NA**	**mg/L**	E. coli	**<QL**	**n/CML**	BOD_5, Jan. – May	**NA**	**mg/L**
TSS, June-Dec.	**12**	**mg/L**	TRC, Total Contact	**1.2**	**mg/L**	TRC, Inst Tech Min Limit	**1.2**	**mg/L**
TRC, Inst Res Max	**<QL**	**mg/L**	TKN	**14**	**mg/L**	$CBOD_5$ June – Dec.	**12**	**mg/L**

Quarter average: (Effluent) **October - December 2007**

Flow:	**0.008**	**MGD**	pH	**8.0**	**S.U.**	DO	**9.5**	**mg/L**
TSS, Jan.- May	**NA**	**mg/L**	E. coli	**26**	**n/CML**	BOD_5, Jan. – May	**NA**	**mg/L**
TSS, June-Dec.	**7.8**	**mg/L**	TRC, Total Contact	**1.1**	**mg/L**	TRC, Inst Tech Min Limit	**1.1**	**mg/L**
TRC, Inst Res Max	**<QL**	**mg/L**	TKN	**6.8**	**mg/L**	$CBOD_5$ June – Dec.	**1.3**	**mg/L**

DATA VERIFIED IN PREFACE	[ ] Updated	[**X**] No changes	
Has there been any new construction?	[**X**] Yes	[ ] No	
If yes, were plans and specifications approved?	[**X**] Yes	[ ] No	[ ] NA

DEQ approval date: **Facility installed a new Parkson Dynasand ® upflow filter system. The CTO was issued on December 3, 2007.**

(A) PLANT OPERATION AND MAINTENANCE

1. Class and number of licensed operators: I **1** II **0** III **2** IV **0** Trainee **2**
2. Hours per day plant is manned: **2 hours per day/ 7 days per week**
3. Describe adequacy of staffing. [ ] Good [**X**] Average [ ] Poor
4. Does the plant have an established program for training personnel? [**X**] Yes [ ] No
5. Describe the adequacy of the training program. [**X**] Good [ ] Average [ ] Poor
6. Are preventive maintenance tasks scheduled? [**X**]Yes [ ]No
7. Describe the adequacy of maintenance. [**X**] Good [ ] Average [ ] Poor*
8. Does the plant experience any organic/hydraulic overloading? [ ] Yes [**X**] No
   If yes, identify cause and impact on plant:
9. Any bypassing since last inspection? [ ] Yes [**X**] No
10. Is the standby electric generator operational? [ ] Yes [ ] No* [**X**] NA
11. Is the STP alarm system operational? [**X**] Yes [ ] No* [ ] NA
12. How often is the standby generator exercised? **NA**
    Power Transfer Switch?
    Alarm System?
13. When was the cross connection control device last tested on the potable water service? **08/30/07**
14. Is sludge being disposed in accordance with the approved sludge disposal plan?
    [**X**] Yes [ ] No [ ] NA
15. Is septage received by the facility? [ ] Yes [**X**] No
    Is septage loading controlled? [ ] Yes [ ] No
    Are records maintained? [ ] Yes [ ] No
16. Overall appearance of facility: [**X**] Good [ ] Average [ ] Poor

Comments:

4. VA Tech Short School, Activated Sludge classes, Process Control classes, Sacramento Book Series, etc.

11. Phone and pager system that alerts when there is a high level alarm and/or power outages.

14. Sludge is removed by a pump and haul septic service and is currently taken to the Remington WWTP (VA0076805).

(B) PLANT RECORDS

1. Which of the following records does the plant maintain?

Operational Logs for each unit process	[**X**] Yes	[ ] No	[ ] NA
Instrument maintenance and calibration	[**X**] Yes	[ ] No	[ ] NA
Mechanical equipment maintenance	[**X**] Yes	[ ] No	[ ] NA
Industrial waste contribution (Municipal Facilities)	[ ] Yes	[ ] No	[**X**] NA

2. What does the operational log contain?

[**X**] Visual observations
[**X**] Laboratory results
[ ] Control calculations
[**X**] Flow measurement
[**X**] Process adjustments
[ ] Other (specify)

Comments:

3. What do the mechanical equipment records contain?

[**X**] As built plans and specs
[**X**] Manufacturers instructions
[ ] Lubrication schedules
[**X**] Spare parts inventory
[**X**] Equipment/parts suppliers
[ ] Other (specify)

Comments:

4. What do the industrial waste contribution records contain? (Municipal Only)

[ ] Waste characteristics
[ ] Impact on plant
[ ] Locations and discharge types
[ ] Other (specify)

Comments: **NA**

5. Which of the following records are kept at the plant and available to personnel?

[**X**] Equipment maintenance records
[ ] Industrial contributor records
[**X**] Sampling and testing records
[**X**] Operational Log
[**X**] Instrumentation records

6. Records not normally available to plant personnel and their location: **None**

7. Were the records reviewed during the inspection? [**X**] Yes [ ] No

8. Are the records adequate and the O & M Manual current? [**X**] Yes [ ] No

9. Are the records maintained for the required 3-year time period? [**X**] Yes [ ] No

Comments:

8. **The O&M Manual was just recently updated by the facility after a new filter was installed. (September 25, 2007)**

(C) SAMPLING

1. Do sampling locations appear to be capable of providing representative samples? [**X**] Yes [ ] No*
2. Do sample types correspond to those required by the VPDES permit? [**X**] Yes [ ] No*
3. Do sampling frequencies correspond to those required by the VPDES permit? [**X**] Yes [ ] No*
4. Are composite samples collected in proportion to flow? [ ] Yes [ ] No*[**X**] NA
5. Are composite samples refrigerated during collection? [ ] Yes [ ] No*[**X**] NA
6. Does plant maintain required records of sampling? [**X**] Yes [ ] No*
7. Does plant run operational control tests? [**X**] Yes [ ] No

Comments:

(D) TESTING

1. Who performs the testing? [**X**] Plant [ ] Central Lab [**X**] Commercial Lab

Name: **Facility – Chlorine, DO, and pH**
ESS – TSS, BOD_5, $CBOD_5$, TKN, and E. Coli

If plant performs any testing, complete 2-4.

2. What method is used for chlorine analysis? **Hach DPD Pocket Colorimeter II**
3. Does plant appear to have sufficient equipment to perform required tests? [**X**] Yes [ ] No*
4. Does testing equipment appear to be clean and/or operable? [**X**] Yes [ ] No*

Comments:

(E) FOR INDUSTRIAL FACILITIES WITH TECHNOLOGY BASED LIMITS ONLY

1. Is the production process as described in the permit application? (If no, describe changes in comments)
[ ] Yes [ ] No [**X**] NA
2. Do products and production rates correspond as provided in the permit application? (If no, list differences)
[ ] Yes [ ] No [**X**] NA
3. Has the State been notified of the changes and their impact on plant effluent? Date:
[ ] Yes [ ] No* [**X**] NA

Comments:

Wastewater Treatment Description:

This facility is a publicly owned (by the Culpeper County School Board) sewage treatment plant which serves one (1) elementary school (Emerald Hill Elementary School) with a maximum student population of 1,000. The treatment system has a current design flow of 0.01 MGD.

System design consists of a bar screen, with extended aeration basin with activated sludge, followed by filtration and disinfection.

Wastewater first enters the treatment system through the bar screen (which is manually cleaned) and then flows to the equalization basin. Wastewater is then pumped to the first of two (2) aeration basins arranged in series and then to the clarifier/settling basin. Secondary sludge may be returned to the aeration basins for additional treatment or wasted to the aerated sludge holding tank. Clarified wastewater then flows through the new Parkson Dynasand ® upflow filter system. The CTO for this new filter was issued on December 3, 2007. Following filtration, wastewater flows to the chlorine contact tank where disinfection is provided via chlorine tablets, followed by dechlorination and post aeration prior to being discharged into Muddy Run.

Sludge Treatment and Disposal Methods:

Excess sludge is pumped from the sludge holding tank quarterly and hauled by an independent contractor to the Remington WWTP (VA0076805) in Fauquier County.

Material Storage:

Material Storage		
Materials Description	Volume Stored	Spill/Stormwater Prevention Measures
Chlorination Tablets	3 – 5 gallon buckets	Stored in covered storage bin inside fenced area with a lock.
Dechlorination Tablets	3 – gallon buckets	Stored in covered storage bin inside fenced area with a lock.
Soda Ash	3 – 50 lb. bags	Stored in storage closet adjoining the lab building.

UNIT PROCESS: Screening/Comminution

1.	Number of Units:	Manual:	**1**	Mechanical:	**0**
	Number in operation:	Manual:	**1**	Mechanical:	**0**
2.	Bypass channel provided:		[ ] Yes	[**X**] No*	
	Bypass channel in use:		[ ] Yes	[ ] No	
3.	Area adequately ventilated:		[**X**] Yes	[ ] No*	
4.	Alarm system for equipment failure or overloads:		[ ] Yes	[**X**] No*	
5.	Proper flow distribution between units:		[ ] Yes	[ ] No	[**X**] NA
6.	How often are units checked and cleaned?		**Manually once per day**		
7.	Cycle of operation:		**Continuous**		
8.	Volume of screenings removed:		**<1 cubic Foot per week**		
9.	General condition:		[**X**] Good	[ ] Fair	[ ] Poor

Comments:

- **The facility has a low volume of screenings. The screenings that are removed from the bar screen are stored in a covered 5-gallon bucket. Once the bucket is full, it emptied in a dumpster to be disposed of in a landfill.**

UNIT PROCESS: Flow Equalization (EQ Tank)

1. Type: [**X**] In-line [ ] Side-line [ ] Spill pond — Number of cells: **4**
2. What unit process does it precede? **Wet Well**
3. Is volume adequate? [**X**] Yes [ ] No
4. Mixing: [ ] None [**X**] Diffused air [ ] Fixed mechanical [ ] Floating mechanical
5. Condition of mixing equipment: [**X**] Good [ ] Average [ ] Poor
6. How drawn off?
   A. Pumped from: [ ] Surface [**X**] Sub-surface [ ] Adjustable
   B. Weir [**X**] Surface [ ] Sub-surface
7. Is containment structure in good condition? [**X**] Yes [ ] No
8. Are the facilities to flush solids and grease from basin walls adequate? [**X**] Yes [ ] No [ ] NA
9. Are there facilities for withdrawing floating material and foam? [**X**] Yes [ ] No
10. How are solids removed? [ ] Drain down [ ] Drag line [ ] NA [**X**] Other **(Hand Skimmer)**

    Is it adequate? [**X**] Yes [ ] No
11. Is the emergency overflow in good condition? [**X**] Yes [ ] No [ ] NA
12. Are the depth gauges in good condition? [ ] Yes [ ] No [**X**] NA

Comments:

- **There are two pumps used in the lead-lag function (one pump is the fixed lead and the second is pump is the fixed lag).**

UNIT PROCESS: Flow Measurement

[ ] Influent [**X**] Intermediate [ ] Effluent

1. Type measuring device: **Manual Bucket Estimation**
2. Present reading: **Not discharging at the time of inspection.**
3. Bypass channel: [ ] Yes [**X**] No
   Metered: [ ] Yes [ ] No
4. Return flows discharged upstream from meter: [ ] Yes [**X**] No
   Identify:
5. Device operating properly: [**X**] Yes [ ] No*
6. Date of last calibration: **NA**
7. Evidence of following problems:
   a. obstructions [ ] Yes* [**X**] No
   b. grease [ ] Yes* [**X**] No
8. General condition: [**X**] Good [ ] Fair [ ] Poor

Comments:

6. **The flow is measured where the influent flow comes into the Flow Equalization tank from the influent wet well. The flow is measured using a bucket "calibrated bucket test" (time versus volume).**

UNIT PROCESS: Activated Sludge Aeration (Extended)

1. Number of units: **2** In operation: **2**

2. Mode of operation: **Continuous in series**

3. Proper flow distribution between units: [**X**] Yes [ ] No* [ ] NA

4. Foam control operational: [ ] Yes [**X**] No* [ ] NA

5. Scum control operational: [ ] Yes [ ] No* [**X**] NA

6. Evidence of following problems:
   a. dead spots [ ] Yes* [**X**] No
   b. excessive foam [ ] Yes* [**X**] No
   c. poor aeration [ ] Yes* [**X**] No
   d. excessive aeration [ ] Yes* [**X**] No
   e. excessive scum [ ] Yes* [**X**] No
   f. aeration equipment malfunction [ ] Yes* [**X**] No
   g. other (identify in comments) [ ] Yes* [**X**] No

7. Mixed liquor characteristics (as available): **Information for December 8, 2007**

   pH: **8.34 s.u.**
   MLSS: **2270 mg/L**
   DO: **0.60 mg/L**

8. Return/waste sludge:
   a. Return Rate: **4000 GPD**
   b. Waste Rate: **2500 Gallons per week**
   c. Frequency of Wasting: **Once per week in warmer months and twice per month in colder months (MLSS is the defining factor.).**

9. Aeration system control: [ ] Time Clock [**X**] Manual [ ] Continuous [ ] Other (explain)

10. Effluent control devices working properly (oxidation ditches): [ ] Yes [ ] No* [**X**] NA

11. General condition: [**X**] Good [ ] Fair [ ] Poor

Comments:

- **The facility adds on average 25 pounds per week of soda ash for pH control as needed (not continuous).**

4. **Foam sprayer had been repaired after the last inspection. It was just noted that it had just gotten clogged again (in operator logbook) and is slated for repair again.**

VPDES NO. **VA0089354**

UNIT PROCESS: Sedimentation

[**X**] Primary [ ] Secondary [ ] Tertiary

1.	Number of units: **1**	In operation: **1**		
2.	Proper flow distribution between units:	[ ] Yes	[ ] No*	[**X**] NA
3.	Signs of short circuiting and/or overloads:	[ ] Yes	[**X**] No	
4.	Effluent weirs level: Clean:	[**X**] Yes [**X**] Yes	[ ] No* [ ] No*	
5.	Scum collection system working properly:	[**X**] Yes	[ ] No*	[ ] NA
6.	Sludge collection system working properly:	[**X**] Yes	[ ] No*	
7.	Influent, effluent baffle systems working properly:	[**X**] Yes	[ ] No*	
8.	Chemical addition: Chemicals:	[ ] Yes	[**X**] No	
9.	Effluent characteristics:	**Clear**		
10.	General condition:	[ ] Good	[**X**] Fair	[ ] Poor

Comments:

VPDES NO. **VA0089354**

UNIT PROCESS: Filtration

1. Type of filters: [ ] Gravity [**X**] Pressure [ ] Intermittent

2. Number of units: **1** In operation: **1**

3. Operation of system: [ ] Automatic [**X**] Semi-automatic [ ] Manual [ ] Other(specify)

4. Proper flow distribution between units: [ ] Yes [ ] No* [**X**] NA

5. Evidence of following problems:
   a. uneven flow distribution [ ] Yes* [**X**] No
   b filter clogging (ponding) [ ] Yes* [**X**] No
   c. nozzles clogging [ ] Yes* [**X**] No
   d. icing [ ] Yes* [**X**] No
   e. filter flies [ ] Yes* [**X**] No
   f. vegetation on filter [ ] Yes* [**X**] No

6. Filter aid system provided: [**X**] Yes [ ] No
   Properly operating: [ ] Yes [ ] No [**X**] NA
   Chemical used: **Alum (available to add if needed but has never been used)**

7. Automatic valves properly operating: [**X**] Yes* [ ] No* [ ] NA

8. Valves sequencing correctly: [**X**] Yes* [ ] No* [ ] NA

9. Backwash system operating properly: [**X**] Yes* [ ] No* [ ] NA

10. Filter building adequately ventilated: [**X**] Yes* [ ] No* [ ] NA

11. Effluent characteristics: **NA**

12. General condition: [**X**] Good [ ] Fair [ ] Poor

Comments:

- **Parkson Dynasand ® upflow filters with continuous backwash is a new filter that was installed in late 2007 to replace an older filter.**
- **The facility has the ability to send the backwash water back to one of three places (influent wet well, sludge holding tank or the 2nd cell of the extended aeration tank).**
- **The facility keeps extra filter media on site to replenish the media as needed.**

UNIT PROCESS: Chlorination

1 No. of chlorinators: **1** In operation: **1**

2. No. of evaporators: **0** In operation: **0**

3. No. of chlorine contact tanks: **1** In operation: **1**

4. Proper flow distribution between units: [ ] Yes [ ] No* [**X**] NA

5. How is chlorine introduced into the wastewater?
   [ ] Perforated diffusers
   [ ] Injector with single entry point
   [**X**] Other – **Tablet Feeder (Two Tubes)**

6. Chlorine residual in basin effluent: **Not taken at the time of inspection as the facility was not discharging at the time of inspection.**

7. Applied chlorine dosage: **Approximately 1 Tablet per Day (depending upon flow)**

8. Contact basins adequately baffled: [**X**] Yes [ ] No*

9. Adequate ventilation:
   a. cylinder storage area [ ] Yes [ ] No* [**X**] NA
   b. equipment room [ ] Yes [ ] No* [**X**] NA

10. Proper safety precautions used: [**X**] Yes [ ] No*

11. General condition: [**X**] Good [ ] Fair [ ] Poor

Comments:

UNIT PROCESS: Dechlorination

1. Chemical used: [ ] Sulfur Dioxide [**X**] Bisulfite [ ] Other

2. No. of sulfonators: **0** In operation: **0**

3. No. of evaporators: **0** In operation: **0**

4. No. of chemical feeders: **1** In operation: **1**

5. No. of contact tanks: **1** In operation: **1**

6. Proper flow distribution between units: [ ] Yes [ ] No* [**X**] NA

7. How is chemical introduced into the wastewater?
   [ ] Perforated diffusers
   [ ] Injector with single entry point
   [**X**] Other – **Tablet Feeder (Two Tubes)**

8. Control system operational: [**X**] Yes [ ] No*
   a. residual analyzers: [ ] Yes [**X**] No*
   b. system adjusted: [ ] Automatic [**X**] Manual [ ] Other:

9. Applied dechlorination dose: **Approximately 1 Tablet per Day (depending upon flow)**

10. Chlorine residual in basin effluent: **Not taken at the time of inspection as the facility was not discharging at the time of inspection.**

11. Contact basins adequately baffled: [**X**] Yes [ ] No* [ ] NA

12. Adequate ventilation:
    a. cylinder storage area: [**X**] Yes [ ] No*
    b. equipment room: [**X**] Yes [ ] No*

13. Proper safety precautions used: [**X**] Yes [ ] No*

14. General condition: [**X**] Good [ ] Fair [ ] Poor

Comments:

UNIT PROCESS: Post Aeration

1. Number of units: **1** In operation: **1**

2. Proper flow distribution between units: [ ] Yes [ ] No* [**X**] NA

3. Evidence of following problems:
   a. dead spots [ ] Yes* [**X**] No
   b. excessive foam [ ] Yes* [**X**] No
   c. poor aeration [ ] Yes* [**X**] No
   d. mechanical equipment failure [ ] Yes* [**X**] No [ ] NA

4. How is the aerator controlled? [ ] Time clock [ ] Manual [**X**] Continuous [ ] Other* [ ] NA

5. What is the current operating schedule? **Continuous**

6. Step weirs level: [ ] Yes [ ] No [**X**] NA

7. Effluent D.O. level: **Not taken at the time of inspection as the facility was not discharging at the time of inspection.**

8. General condition: [**X**] Good [ ] Fair [ ] Poor

Comments:

UNIT PROCESS: Effluent/Plant Outfall

1. Type Outfall [ ] Shore based [**X**] Submerged
2. Type if shore based: [ ] Wingwall [ ] Headwall [ ] Rip Rap
3. Flapper valve: [ ] Yes [**X**] No [ ] NA
4. Erosion of bank: [ ] Yes [**X**] No [ ] NA
5. Effluent plume visible? [ ] Yes* [**X**] No
6. Condition of outfall and supporting structures: [**X**] Good [ ] Fair [ ] Poor*
7. Final effluent, evidence of following problems:
   a. oil sheen [ ] Yes* [**X**] No
   b. grease [ ] Yes* [**X**] No
   c. sludge bar [ ] Yes* [**X**] No
   d. turbid effluent [ ] Yes* [**X**] No
   e. visible foam [ ] Yes* [**X**] No
   f. unusual color [ ] Yes* [**X**] No

Comments:

5. There was no discharge at the time of inspection.

FRESHWATER
WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: Emerald Hill Elementary WWTP Permit No.: VA0089354

Receiving Stream: Muddy Run Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information

Mean Hardness (as CaCO3) =	50	mg/L
90% Temperature (Annual) =	23	deg C
90% Temperature (Wet season) =	16.4	deg C
90% Maximum pH =	7.5	SU
10% Maximum pH =		SU
Tier Designation (1 or 2) =	2	
Public Water Supply (PWS) Y/N? =	n	
Trout Present Y/N? =	n	
Early Life Stages Present Y/N? =	y	

Stream Flows

1Q10 (Annual) =	0.18	MGD
7Q10 (Annual) =	0.26	MGD
30Q10 (Annual) =	0.53	MGD
1Q10 (Wet season) =	2.8	MGD
30Q10 (Wet season)	4.6	MGD
30Q5 =	0.88	MGD
Harmonic Mean =	3.8	MGD

Mixing Information

Annual - 1Q10 Mix =	100	%
- 7Q10 Mix =	100	%
- 30Q10 Mix =	100	%
Wet Season - 1Q10 Mix =	100	%
- 30Q10 Mix =	100	%

Effluent Information

Mean Hardness (as CaCO3) =	50	mg/L
90% Temp (Annual) =	24.1	deg C
90% Temp (Wet season) =	16.3	deg C
90% Maximum pH =	7.5	SU
10% Maximum pH =		SU
Discharge Flow =	0.01	MGD

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Acenapthene	5	--	--	na	9.9E+02	--	--	na	8.8E+04	--	--	na	1.0E+02	--	--	na	8.8E+03	--	--	na	**8.8E+03**
Acrolein	0	--	--	na	9.3E+00	--	--	na	8.3E+02	--	--	na	9.3E-01	--	--	na	8.3E+01	--	--	na	**8.3E+01**
Acrylonitrile [C]	0	--	--	na	2.5E+00	--	--	na	9.5E+02	--	--	na	2.5E-01	--	--	na	9.5E+01	--	--	na	**9.5E+01**
Aldrin [C]	0	3.0E+00	--	na	5.0E-04	5.7E+01	--	na	1.9E-01	7.5E-01	--	na	5.0E-05	1.4E+01	--	na	1.9E-02	**1.4E+01**	--	na	**1.9E-02**
Ammonia-N (mg/l) (Yearly)	0	1.99E+01	2.52E+00	na	--	3.78E+02	1.36E+02	na	--	4.97E+00	6.31E-01	na	--	9.45E+01	3.41E+01	na	--	**9.45E+01**	**3.41E+01**	na	--
Ammonia-N (mg/l) (High Flow)	0	1.99E+01	3.87E+00	na	--	5.59E+03	1.78E+03	na	--	4.97E+00	9.66E-01	na	--	1.40E+03	4.46E+02	na	--	**1.40E+03**	**4.46E+02**	na	--
Anthracene	0	--	--	na	4.0E+04	--	--	na	3.6E+06	--	--	na	4.0E+03	--	--	na	3.6E+05	--	--	na	**3.6E+05**
Antimony	0	--	--	na	6.4E+02	--	--	na	5.7E+04	--	--	na	6.4E+01	--	--	na	5.7E+03	--	--	na	**5.7E+03**
Arsenic	o	3.4E+02	1.5E+02	na	--	6.5E+03	4.1E+03	na	--	8.5E+01	3.8E+01	na	--	1.6E+03	1.0E+03	na	--	**1.6E+03**	**1.0E+03**	na	--
Barium	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Benzene [C]	0	--	--	na	5.1E+02	--	--	na	1.9E+05	--	--	na	5.1E+01	--	--	na	1.9E+04	--	--	na	**1.9E+04**
Benzidine [C]	0	--	--	na	2.0E-03	--	--	na	7.6E-01	--	--	na	2.0E-04	--	--	na	7.6E-02	--	--	na	**7.6E-02**
Benzo (a) anthracene [C]	0	--	--	na	1.8E-01	--	--	na	6.9E+01	--	--	na	1.8E-02	--	--	na	6.9E+00	--	--	na	**6.9E+00**
Benzo (b) fluoranthene [C]	0	--	--	na	1.8E-01	--	--	na	6.9E+01	--	--	na	1.8E-02	--	--	na	6.9E+00	--	--	na	**6.9E+00**
Benzo (k) fluoranthene [C]	0	--	--	na	1.8E-01	--	--	na	6.9E+01	--	--	na	1.8E-02	--	--	na	6.9E+00	--	--	na	**6.9E+00**
Benzo (a) pyrene [C]	0	--	--	na	1.8E-01	--	--	na	6.9E+01	--	--	na	1.8E-02	--	--	na	6.9E+00	--	--	na	**6.9E+00**
Bis2-Chloroethyl Ether [C]	0	--	--	na	5.3E+00	--	--	na	2.0E+03	--	--	na	5.3E-01	--	--	na	2.0E+02	--	--	na	**2.0E+02**
Bis2-Chloroisopropyl Ether	0	--	--	na	6.5E+04	--	--	na	5.8E+06	--	--	na	6.5E+03	--	--	na	5.8E+05	--	--	na	**5.8E+05**
Bis 2-Ethylhexyl Phthalate [C]	0	--	--	na	2.2E+01	--	--	na	8.4E+03	--	--	na	2.2E+00	--	--	na	8.4E+02	--	--	na	**8.4E+02**
Bromoform [C]	0	--	--	na	1.4E+03	--	--	na	5.3E+05	--	--	na	1.4E+02	--	--	na	5.3E+04	--	--	na	**5.3E+04**
Butylbenzylphthalate	0	--	--	na	1.9E+03	--	--	na	1.7E+05	--	--	na	1.9E+02	--	--	na	1.7E+04	--	--	na	**1.7E+04**
Cadmium	0	1.8E+00	6.6E-01	na	--	3.4E+01	1.8E+01	na	--	4.5E-01	1.6E-01	na	--	8.5E+00	4.4E+00	na	--	**8.5E+00**	**4.4E+00**	na	--
Carbon Tetrachloride [C]	0	--	--	na	1.6E+01	--	--	na	6.1E+03	--	--	na	1.6E+00	--	--	na	6.1E+02	--	--	na	**6.1E+02**
Chlordane [C]	0	2.4E+00	4.3E-03	na	8.1E-03	4.6E+01	1.2E-01	na	3.1E+00	6.0E-01	1.1E-03	na	8.1E-04	1.1E+01	2.9E-02	na	3.1E-01	**1.1E+01**	**2.9E-02**	na	**3.1E-01**
Chloride	0	8.6E+05	2.3E+05	na	--	1.6E+07	6.2E+06	na	--	2.2E+05	5.8E+04	na	--	4.1E+06	1.6E+06	na	--	**4.1E+06**	**1.6E+06**	na	--
TRC	0	1.9E+01	1.1E+01	na	--	3.6E+02	3.0E+02	na	--	4.8E+00	2.8E+00	na	--	9.0E+01	7.4E+01	na	--	**9.0E+01**	**7.4E+01**	na	--
Chlorobenzene	0	--	--	na	1.6E+03	--	--	na	1.4E+05	--	--	na	1.6E+02	--	--	na	1.4E+04	--	--	na	**1.4E+04**

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Chlorodibromomethane[C]	0	--	--	na	1.3E+02	--	--	na	5.0E+04	--	--	na	1.3E+01	--	--	na	5.0E+03	--	--	na	**5.0E+03**
Chloroform	0	--	--	na	1.1E+04	--	--	na	9.8E+05	--	--	na	1.1E+03	--	--	na	9.8E+04	--	--	na	**9.8E+04**
2-Chloronaphthalene	0	--	--	na	1.6E+03	--	--	na	1.4E+05	--	--	na	1.6E+02	--	--	na	1.4E+04	--	--	na	**1.4E+04**
2-Chlorophenol	0	--	--	na	1.5E+02	--	--	na	1.3E+04	--	--	na	1.5E+01	--	--	na	1.3E+03	--	--	na	**1.3E+03**
Chlorpyrifos	0	8.3E-02	4.1E-02	na	--	1.6E+00	1.1E+00	na	--	2.1E-02	1.0E-02	na	--	3.9E-01	2.8E-01	na	--	**3.9E-01**	**2.8E-01**	na	--
Chromium III	0	3.2E+02	4.2E+01	na	--	6.1E+03	1.1E+03	na	--	8.1E+01	1.1E+01	na	--	1.5E+03	2.8E+02	na	--	**1.5E+03**	**2.8E+02**	na	--
Chromium VI	0	1.6E+01	1.1E+01	na	--	3.0E+02	3.0E+02	na	--	4.0E+00	2.8E+00	na	--	7.6E+01	7.4E+01	na	--	**7.6E+01**	**7.4E+01**	na	--
Chromium, Total	0	--	--	1.0E+02	--	--	--	na	--	--	--	1.0E+01	--	--	--	8.9E+02	--	--	--	na	--
Chrysene [C]	0	--	--	na	1.8E-02	--	--	na	6.9E+00	--	--	na	1.8E-03	--	--	na	6.9E-01	--	--	na	**6.9E-01**
Copper	0	7.0E+00	5.0E+00	na	--	1.3E+02	1.3E+02	na	--	1.7E+00	1.2E+00	na	--	3.3E+01	3.3E+01	na	--	**3.3E+01**	**3.3E+01**	na	--
Cyanide, Free	0	2.2E+01	5.2E+00	na	1.6E+04	4.2E+02	1.4E+02	na	1.4E+06	5.5E+00	1.3E+00	na	1.6E+03	1.0E+02	3.5E+01	na	1.4E+05	**1.0E+02**	**3.5E+01**	na	**1.4E+05**
DDD [C]	0	--	--	na	3.1E-03	--	--	na	1.2E+00	--	--	na	3.1E-04	--	--	na	1.2E-01	--	--	na	**1.2E-01**
DDE [C]	0	--	--	na	2.2E-03	--	--	na	8.4E-01	--	--	na	2.2E-04	--	--	na	8.4E-02	--	--	na	**8.4E-02**
DDT [C]	0	1.1E+00	1.0E-03	na	2.2E-03	2.1E+01	2.7E-02	na	8.4E-01	2.8E-01	2.5E-04	na	2.2E-04	5.2E+00	6.8E-03	na	8.4E-02	**5.2E+00**	**6.8E-03**	na	**8.4E-02**
Demeton	0	--	1.0E-01	na	--	--	2.7E+00	na	--	--	2.5E-02	na	--	--	6.8E-01	na	--	--	**6.8E-01**	na	--
Diazinon	0	1.7E-01	1.7E-01	na	--	3.2E+00	4.6E+00	na	--	4.3E-02	4.3E-02	na	--	8.1E-01	1.1E+00	na	--	**8.1E-01**	**1.1E+00**	na	--
Dibenz(a,h)anthracene [C]	0	--	--	na	1.8E-01	--	--	na	6.9E+01	--	--	na	1.8E-02	--	--	na	6.9E+00	--	--	na	**6.9E+00**
1,2-Dichlorobenzene	0	--	--	na	1.3E+03	--	--	na	1.2E+05	--	--	na	1.3E+02	--	--	na	1.2E+04	--	--	na	**1.2E+04**
1,3-Dichlorobenzene	0	--	--	na	9.6E+02	--	--	na	8.5E+04	--	--	na	9.6E+01	--	--	na	8.5E+03	--	--	na	**8.5E+03**
1,4-Dichlorobenzene	0	--	--	na	1.9E+02	--	--	na	1.7E+04	--	--	na	1.9E+01	--	--	na	1.7E+03	--	--	na	**1.7E+03**
3,3-Dichlorobenzidine[C]	0	--	--	na	2.8E-01	--	--	na	1.1E+02	--	--	na	2.8E-02	--	--	na	1.1E+01	--	--	na	**1.1E+01**
Dichlorobromomethane [C]	0	--	--	na	1.7E+02	--	--	na	6.5E+04	--	--	na	1.7E+01	--	--	na	6.5E+03	--	--	na	**6.5E+03**
1,2-Dichloroethane [C]	0	--	--	na	3.7E+02	--	--	na	1.4E+05	--	--	na	3.7E+01	--	--	na	1.4E+04	--	--	na	**1.4E+04**
1,1-Dichloroethylene	0	--	--	na	7.1E+03	--	--	na	6.3E+05	--	--	na	7.1E+02	--	--	na	6.3E+04	--	--	na	**6.3E+04**
1,2-trans-dichloroethylene	0	--	--	na	1.0E+04	--	--	na	8.9E+05	--	--	na	1.0E+03	--	--	na	8.9E+04	--	--	na	**8.9E+04**
2,4-Dichlorophenol	0	--	--	na	2.9E+02	--	--	na	2.6E+04	--	--	na	2.9E+01	--	--	na	2.6E+03	--	--	na	**2.6E+03**
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
1,2-Dichloropropane[C]	0	--	--	na	1.5E+02	--	--	na	5.7E+04	--	--	na	1.5E+01	--	--	na	5.7E+03	--	--	na	**5.7E+03**
1,3-Dichloropropene [C]	0	--	--	na	2.1E+02	--	--	na	8.0E+04	--	--	na	2.1E+01	--	--	na	8.0E+03	--	--	na	**8.0E+03**
Dieldrin [C]	0	2.4E-01	5.6E-02	na	5.4E-04	4.6E+00	1.5E+00	na	2.1E-01	6.0E-02	1.4E-02	na	5.4E-05	1.1E+00	3.8E-01	na	2.1E-02	**1.1E+00**	**3.8E-01**	na	**2.1E-02**
Diethyl Phthalate	0	--	--	na	4.4E+04	--	--	na	3.9E+06	--	--	na	4.4E+03	--	--	na	3.9E+05	--	--	na	**3.9E+05**
2,4-Dimethylphenol	0	--	--	na	8.5E+02	--	--	na	7.6E+04	--	--	na	8.5E+01	--	--	na	7.6E+03	--	--	na	**7.6E+03**
Dimethyl Phthalate	0	--	--	na	1.1E+06	--	--	na	9.8E+07	--	--	na	1.1E+05	--	--	na	9.8E+06	--	--	na	**9.8E+06**
Di-n-Butyl Phthalate	0	--	--	na	4.5E+03	--	--	na	4.0E+05	--	--	na	4.5E+02	--	--	na	4.0E+04	--	--	na	**4.0E+04**
2,4 Dinitrophenol	0	--	--	na	5.3E+03	--	--	na	4.7E+05	--	--	na	5.3E+02	--	--	na	4.7E+04	--	--	na	**4.7E+04**
2-Methyl-4,6-Dinitrophenol	0	--	--	na	2.8E+02	--	--	na	2.5E+04	--	--	na	2.8E+01	--	--	na	2.5E+03	--	--	na	**2.5E+03**
2,4-Dinitrotoluene [C]	0	--	--	na	3.4E+01	--	--	na	1.3E+04	--	--	na	3.4E+00	--	--	na	1.3E+03	--	--	na	**1.3E+03**
Dioxin 2,3,7,8-tetrachlorodibenzo-p-dioxin	0	--	--	na	5.1E-08	--	--	na	4.5E-06	--	--	na	5.1E-09	--	--	na	4.5E-07	--	--	na	**4.5E-07**
1,2-Diphenylhydrazine[C]	0	--	--	na	2.0E+00	--	--	na	7.6E+02	--	--	na	2.0E-01	--	--	na	7.6E+01	--	--	na	**7.6E+01**
Alpha-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	4.2E+00	1.5E+00	na	7.9E+03	5.5E-02	1.4E-02	na	8.9E+00	1.0E+00	3.8E-01	na	7.9E+02	**1.0E+00**	**3.8E-01**	na	**7.9E+02**
Beta-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	4.2E+00	1.5E+00	na	7.9E+03	5.5E-02	1.4E-02	na	8.9E+00	1.0E+00	3.8E-01	na	7.9E+02	**1.0E+00**	**3.8E-01**	na	**7.9E+02**
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	4.2E+00	1.5E+00	--	--	5.5E-02	1.4E-02	--	--	1.0E+00	3.8E-01	--	--	**1.0E+00**	**3.8E-01**	--	--
Endosulfan Sulfate	0	--	--	na	8.9E+01	--	--	na	7.9E+03	--	--	na	8.9E+00	--	--	na	7.9E+02	--	--	na	**7.9E+02**
Endrin	0	8.6E-02	3.6E-02	na	6.0E-02	1.6E+00	9.7E-01	na	5.3E+00	2.2E-02	9.0E-03	na	6.0E-03	4.1E-01	2.4E-01	na	5.3E-01	**4.1E-01**	**2.4E-01**	na	**5.3E-01**
Endrin Aldehyde	0	--	--	na	3.0E-01	--	--	na	2.7E+01	--	--	na	3.0E-02	--	--	na	2.7E+00	--	--	na	**2.7E+00**

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Ethylbenzene	0	--	--	na	2.1E+03	--	--	na	1.9E+05	--	--	na	2.1E+02	--	--	na	1.9E+04	--	--	na	1.9E+04
Fluoranthene	0	--	--	na	1.4E+02	--	--	na	1.2E+04	--	--	na	1.4E+01	--	--	na	1.2E+03	--	--	na	1.2E+03
Fluorene	0	--	--	na	5.3E+03	--	--	na	4.7E+05	--	--	na	5.3E+02	--	--	na	4.7E+04	--	--	na	4.7E+04
Foaming Agents	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Guthion	0	--	1.0E-02	na	--	--	2.7E-01	na	--	--	2.5E-03	na	--	--	6.8E-02	na	--	--	6.8E-02	na	--
Heptachlor [C]	0	5.2E-01	3.8E-03	na	7.9E-04	9.9E+00	1.0E-01	na	3.0E-01	1.3E-01	9.5E-04	na	7.9E-05	2.5E+00	2.6E-02	na	3.0E-02	2.5E+00	2.6E-02	na	3.0E-02
Heptachlor Epoxide[C]	0	5.2E-01	3.8E-03	na	3.9E-04	9.9E+00	1.0E-01	na	1.5E-01	1.3E-01	9.5E-04	na	3.9E-05	2.5E+00	2.6E-02	na	1.5E-02	2.5E+00	2.6E-02	na	1.5E-02
Hexachlorobenzene[C]	0	--	--	na	2.9E-03	--	--	na	1.1E+00	--	--	na	2.9E-04	--	--	na	1.1E-01	--	--	na	1.1E-01
Hexachlorobutadiene[C]	0	--	--	na	1.8E+02	--	--	na	6.9E+04	--	--	na	1.8E+01	--	--	na	6.9E+03	--	--	na	6.9E+03
Hexachlorocyclohexane Alpha-BHC[C]	0	--	--	na	4.9E-02	--	--	na	1.9E+01	--	--	na	4.9E-03	--	--	na	1.9E+00	--	--	na	1.9E+00
Hexachlorocyclohexane Beta-BHC[C]	0	--	--	na	1.7E-01	--	--	na	6.5E+01	--	--	na	1.7E-02	--	--	na	6.5E+00	--	--	na	6.5E+00
Hexachlorocyclohexane Gamma-BHC[C] (Lindane)	0	9.5E-01	na	na	1.8E+00	1.8E+01	--	na	6.9E+02	2.4E-01	--	na	1.8E-01	4.5E+00	--	na	6.9E+01	4.5E+00	--	na	6.9E+01
Hexachlorocyclopentadiene	0	--	--	na	1.1E+03	--	--	na	9.8E+04	--	--	na	1.1E+02	--	--	na	9.8E+03	--	--	na	9.8E+03
Hexachloroethane[C]	0	--	--	na	3.3E+01	--	--	na	1.3E+04	--	--	na	3.3E+00	--	--	na	1.3E+03	--	--	na	1.3E+03
Hydrogen Sulfide	0	--	2.0E+00	na	--	--	5.4E+01	na	--	--	5.0E-01	na	--	--	1.4E+01	na	--	--	1.4E+01	na	--
Indeno (1,2,3-cd) pyrene [C]	0	--	--	na	1.8E-01	--	--	na	6.9E+01	--	--	na	1.8E-02	--	--	na	6.9E+00	--	--	na	6.9E+00
Iron	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Isophorone[C]	0	--	--	na	9.6E+03	--	--	na	3.7E+06	--	--	na	9.6E+02	--	--	na	3.7E+05	--	--	na	3.7E+05
Kepone	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	0.0E+00	na	--	--	0.0E+00	na	--	--	0.0E+00	na	--
Lead	0	4.9E+01	5.6E+00	na	--	9.3E+02	1.5E+02	na	--	1.2E+01	1.4E+00	na	--	2.3E+02	3.8E+01	na	--	2.3E+02	3.8E+01	na	--
Malathion	0	--	1.0E-01	na	--	--	2.7E+00	na	--	--	2.5E-02	na	--	--	6.8E-01	na	--	--	6.8E-01	na	--
Manganese	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Mercury	0	1.4E+00	7.7E-01	--	--	2.7E+01	2.1E+01	--	--	3.5E-01	1.9E-01	--	--	6.7E+00	5.2E+00	--	--	6.7E+00	5.2E+00	--	--
Methyl Bromide	0	--	--	na	1.5E+03	--	--	na	1.3E+05	--	--	na	1.5E+02	--	--	na	1.3E+04	--	--	na	1.3E+04
Methylene Chloride [C]	0	--	--	na	5.9E+03	--	--	na	2.2E+06	--	--	na	5.9E+02	--	--	na	2.2E+05	--	--	na	2.2E+05
Methoxychlor	0	--	3.0E-02	na	--	--	8.1E-01	na	--	--	7.5E-03	na	--	--	2.0E-01	na	--	--	2.0E-01	na	--
Mirex	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	0.0E+00	na	--	--	0.0E+00	na	--	--	0.0E+00	na	--
Nickel	0	1.0E+02	1.1E+01	na	4.6E+03	1.9E+03	3.0E+02	na	4.1E+05	2.5E+01	2.8E+00	na	4.6E+02	4.8E+02	7.6E+01	na	4.1E+04	4.8E+02	7.6E+01	na	4.1E+04
Nitrate (as N)	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Nitrobenzene	0	--	--	na	6.9E+02	--	--	na	6.1E+04	--	--	na	6.9E+01	--	--	na	6.1E+03	--	--	na	6.1E+03
N-Nitrosodimethylamine[C]	0	--	--	na	3.0E+01	--	--	na	1.1E+04	--	--	na	3.0E+00	--	--	na	1.1E+03	--	--	na	1.1E+03
N-Nitrosodiphenylamine[C]	0	--	--	na	6.0E+01	--	--	na	2.3E+04	--	--	na	6.0E+00	--	--	na	2.3E+03	--	--	na	2.3E+03
N-Nitrosodi-n-propylamine[C]	0	--	--	na	5.1E+00	--	--	na	1.9E+03	--	--	na	5.1E-01	--	--	na	1.9E+02	--	--	na	1.9E+02
Nonylphenol	0	2.8E+01	6.6E+00	--	--	5.3E+02	1.8E+02	na	--	7.0E+00	1.7E+00	--	--	1.3E+02	4.5E+01	--	--	1.3E+02	4.5E+01	na	--
Parathion	0	6.5E-02	1.3E-02	na	--	1.2E+00	3.5E-01	na	--	1.6E-02	3.3E-03	na	--	3.1E-01	8.8E-02	na	--	3.1E-01	8.8E-02	na	--
PCB Total[C]	0	--	1.4E-02	na	6.4E-04	--	3.8E-01	na	2.4E-01	--	3.5E-03	na	6.4E-05	--	9.5E-02	na	2.4E-02	--	9.5E-02	na	2.4E-02
Pentachlorophenol [C]	0	7.7E-03	5.9E-03	na	3.0E+01	1.5E-01	1.6E-01	na	1.1E+04	1.9E-03	1.5E-03	na	3.0E+00	3.6E-02	4.0E-02	na	1.1E+03	3.6E-02	4.0E-02	na	1.1E+03
Phenol	0	--	--	na	8.6E+05	--	--	na	7.7E+07	--	--	na	8.6E+04	--	--	na	7.7E+06	--	--	na	7.7E+06
Pyrene	0	--	--	na	4.0E+03	--	--	na	3.6E+05	--	--	na	4.0E+02	--	--	na	3.6E+04	--	--	na	3.6E+04
Radionuclides	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Gross Alpha Activity (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Beta and Photon Activity (mrem/yr)	0	--	--	na	4.0E+00	--	--	na	3.6E+02	--	--	na	4.0E-01	--	--	na	3.6E+01	--	--	na	3.6E+01
Radium 226 + 228 (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Uranium (ug/l)	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Selenium, Total Recoverable	0	2.0E+01	5.0E+00	na	4.2E+03	3.8E+02	1.4E+02	na	3.7E+05	5.0E+00	1.3E+00	na	4.2E+02	9.5E+01	3.4E+01	na	3.7E+04	**9.5E+01**	**3.4E+01**	**na**	**3.7E+04**
Silver	0	1.0E+00	--	na	--	2.0E+01	--	na	--	2.6E-01	--	na	--	5.0E+00	--	na	--	**5.0E+00**	**--**	**na**	**--**
Sulfate	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	**--**	**--**	**na**	**--**
1,1,2,2-Tetrachloroethane[C]	0	--	--	na	4.0E+01	--	--	na	1.5E+04	--	--	na	4.0E+00	--	--	na	1.5E+03	**--**	**--**	**na**	**1.5E+03**
Tetrachloroethylene[C]	0	--	--	na	3.3E+01	--	--	na	1.3E+04	--	--	na	3.3E+00	--	--	na	1.3E+03	**--**	**--**	**na**	**1.3E+03**
Thallium	0	--	--	na	4.7E-01	--	--	na	4.2E+01	--	--	na	4.7E-02	--	--	na	4.2E+00	**--**	**--**	**na**	**4.2E+00**
Toluene	0	--	--	na	6.0E+03	--	--	na	5.3E+05	--	--	na	6.0E+02	--	--	na	5.3E+04	**--**	**--**	**na**	**5.3E+04**
Total dissolved solids	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	**--**	**--**	**na**	**--**
Toxaphene [C]	0	7.3E-01	2.0E-04	na	2.8E-03	1.4E+01	5.4E-03	na	1.1E+00	1.8E-01	5.0E-05	na	2.8E-04	3.5E+00	1.4E-03	na	1.1E-01	**3.5E+00**	**1.4E-03**	**na**	**1.1E-01**
Tributyltin	0	4.6E-01	7.2E-02	na	--	8.7E+00	1.9E+00	na	--	1.2E-01	1.8E-02	na	--	2.2E+00	4.9E-01	na	--	**2.2E+00**	**4.9E-01**	**na**	**--**
1,2,4-Trichlorobenzene	0	--	--	na	7.0E+01	--	--	na	6.2E+03	--	--	na	7.0E+00	--	--	na	6.2E+02	**--**	**--**	**na**	**6.2E+02**
1,1,2-Trichloroethane[C]	0	--	--	na	1.6E+02	--	--	na	6.1E+04	--	--	na	1.6E+01	--	--	na	6.1E+03	**--**	**--**	**na**	**6.1E+03**
Trichloroethylene [C]	0	--	--	na	3.0E+02	--	--	na	1.1E+05	--	--	na	3.0E+01	--	--	na	1.1E+04	**--**	**--**	**na**	**1.1E+04**
2,4,6-Trichlorophenol [C]	0	--	--	na	2.4E+01	--	--	na	9.1E+03	--	--	na	2.4E+00	--	--	na	9.1E+02	**--**	**--**	**na**	**9.1E+02**
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	**--**	**--**	**na**	**--**
Vinyl Chloride[C]	0	--	--	na	2.4E+01	--	--	na	9.1E+03	--	--	na	2.4E+00	--	--	na	9.1E+02	**--**	**--**	**na**	**9.1E+02**
Zinc	0	6.5E+01	6.6E+01	na	2.6E+04	1.2E+03	1.8E+03	na	2.3E+06	1.6E+01	1.6E+01	na	2.6E+03	3.1E+02	4.4E+02	na	2.3E+05	**3.1E+02**	**4.4E+02**	**na**	**2.3E+05**

Notes:

1. All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
2. Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipals
3. Metals measured as Dissolved, unless specified otherwise
4. "C" indicates a carcinogenic parameter
5. Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information.
   Antidegradation WLAs are based upon a complete mix.
6. Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic
   = (0.1(WQC - background conc.) + background conc.) for human health
7. WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens and Harmonic Mean for Carcinogens. To apply mixing ratios from a model set the stream flow equal to (mixing ratio - 1), effluent flow equal to 1 and 100% mix.

Metal	Target Value (SSTV)
Antimony	5.7E+03
Arsenic	6.1E+02
Barium	na
Cadmium	2.7E+00
Chromium III	1.7E+02
Chromium VI	3.0E+01
Copper	1.3E+01
Iron	na
Lead	2.3E+01
Manganese	na
Mercury	2.7E+00
Nickel	4.6E+01
Selenium	2.0E+01
Silver	2.0E+00
Zinc	1.2E+02

Note: do not use QL's lower than the minimum QL's provided in agency guidance

Mixing Zone Predictions for Emerald Hill

Effluent Flow = 0.01 MGD
Stream 7Q10 = .26 MGD
Stream 30Q10 = .53 MGD
Stream 1Q10 = .18 MGD
Stream slope = .001 ft/ft
Stream width = 10 ft
Bottom scale = 3
Channel scale = 1

Mixing Zone Predictions @ 7Q10

Depth = .2524 ft
Length = 291.04 ft
Velocity = .1656 ft/sec
Residence Time = .0203 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 7Q10 may be used.

Mixing Zone Predictions @ 30Q10

Depth = .3865 ft
Length = 200.66 ft
Velocity = .2163 ft/sec
Residence Time = .0107 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 30Q10 may be used.

Mixing Zone Predictions @ 1Q10

Depth = .2037 ft
Length = 350.22 ft
Velocity = .1444 ft/sec
Residence Time = .6737 hours

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 1Q10 may be used.

Virginia DEQ Mixing Zone Analysis Version 2.1

10/6/2011 8:20:02 AM

Facility = Emerald Hill Elem STP
Chemical = Ammonia as N
Chronic averaging period = 30
WLAa = 94.5
WLAc = 34.1
Q.L. = .2
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 9
Variance = 29.16
C.V. = 0.6
97th percentile daily values = 21.9007
97th percentile 4 day average = 14.9741
97th percentile 30 day average= 10.8544
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

9

10/6/2011 8:12:20 AM

Facility = Emerald Hill Elem STP
Chemical = Total Residual Chlorine
Chronic averaging period = 4
WLAa = 0.09
WLAc =
Q.L. = .1
# samples/mo. = 30
# samples/wk. = 8

Summary of Statistics:

observations = 1
Expected Value = .2
Variance = .0144
C.V. = 0.6
97th percentile daily values = .486683
97th percentile 4 day average = .332758
97th percentile 30 day average= .241210
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Acute Toxicity
Maximum Daily Limit = 0.09
Average Weekly limit = 5.36854577311999E-02
Average Monthly LImit = 4.46059047480911E-02

The data are:

0.2

REGIONAL MODELING SYSTEM VERSION 3.2

MODEL SIMULATION FOR THE Emerald Hill E.S. STP (Jan - May) DISCHARGE

TO Emerald Hill E.S. STP (High Flows)

COMMENT: Emerald Hill E.S. STP (Winter..Jan-May)

THE SIMULATION STARTS AT THE Emerald Hill E.S. STP (Jan - May) DISCHARGE

********** PROPOSED PERMIT LIMITS **********

FLOW = .01 MGD cBOD5 = 30 Mg/L TKN = 30 Mg/L D.O. = 6 Mg/L

**** THE MAXIMUM CHLORINE ALLOWABLE IN THE DISCHARGE IS 3.566 Mg/L ****

THE SECTION BEING MODELED IS 1 SEGMENT LONG
RESULTS WILL BE GIVEN AT 0.1 MILE INTERVALS

********** BACKGROUND CONDITIONS **********

THE 7Q10 STREAM FLOW AT THE DISCHARGE IS 3.23150 MGD
THE DISSOLVED OXYGEN OF THE STREAM IS 8.574 Mg/L
THE BACKGROUND cBODu OF THE STREAM IS 5 Mg/L
THE BACKGROUND nBOD OF THE STREAM IS 0 Mg/L

********** MODEL PARAMETERS **********

SEG.	LEN. Mi	VEL. F/S	K2 1/D	K1 1/D	KN 1/D	BENTHIC Mg/L	ELEV. Ft	TEMP. C	DO-SAT Mg/L
1	4.60	0.510	5.217	0.500	0.150	0.000	300.00	17.10	9.527

The K Rates shown are at 20 C ... the model corrects them for temperature.)

*This model run demonstrates that secondary treatment levels ($cBOD_5$ of 30 mg/L) will protect the D.O. standard and comply with antidegredation.

********** RESPONSE FOR S VT 1 **********

TOTAL STREAMFLOW = 3.2415 MGD
(Including Discharge)

DISTANCE FROM HEAD OF SEGMENT (MI.)	TOTAL DISTANCE FROM MODEL BEGINNING (MI.)	DISSOLVED OXYGEN (Mg/L)	cBODu (Mg/L)	nBODu (Mg/L)
0.000	0.000	8.566	5.216	0.361
0.100	0.100	8.574	5.189	0.360
0.200	0.200	8.574	5.161	0.360
0.300	0.300	8.574	5.134	0.359
0.400	0.400	8.574	5.108	0.359
0.500	0.500	8.574	5.081	0.358
0.600	0.600	8.574	5.054	0.358
0.700	0.700	8.574	5.028	0.357
0.800	0.800	8.574	5.001	0.357
0.900	0.900	8.574	5.000	0.356
1.000	1.000	8.574	5.000	0.356
1.100	1.100	8.574	5.000	0.355
1.200	1.200	8.574	5.000	0.355
1.300	1.300	8.574	5.000	0.354
1.400	1.400	8.574	5.000	0.354
1.500	1.500	8.574	5.000	0.353
1.600	1.600	8.574	5.000	0.353
1.700	1.700	8.574	5.000	0.352
1.800	1.800	8.574	5.000	0.352
1.900	1.900	8.574	5.000	0.351
2.000	2.000	8.574	5.000	0.351
2.100	2.100	8.574	5.000	0.350
2.200	2.200	8.574	5.000	0.350
2.300	2.300	8.574	5.000	0.349
2.400	2.400	8.574	5.000	0.349
2.500	2.500	8.574	5.000	0.348
2.600	2.600	8.574	5.000	0.348
2.700	2.700	8.574	5.000	0.347
2.800	2.800	8.574	5.000	0.347
2.900	2.900	8.574	5.000	0.346
3.000	3.000	8.574	5.000	0.346
3.100	3.100	8.574	5.000	0.345
3.200	3.200	8.574	5.000	0.345
3.300	3.300	8.574	5.000	0.344
3.400	3.400	8.574	5.000	0.344
3.500	3.500	8.574	5.000	0.343
3.600	3.600	8.574	5.000	0.343
3.700	3.700	8.574	5.000	0.342
3.800	3.800	8.574	5.000	0.342
3.900	3.900	8.574	5.000	0.341
4.000	4.000	8.574	5.000	0.341
4.100	4.100	8.574	5.000	0.340
4.200	4.200	8.574	5.000	0.340
4.300	4.300	8.574	5.000	0.339
4.400	4.400	8.574	5.000	0.339
4.500	4.500	8.574	5.000	0.338
4.600	4.600	8.574	5.000	0.338

****

REGIONAL MODELING SYSTEM Ver 3.2 (0[illegible] - 9/90)
06-07-1996 14:53:34

DATA FILE = EMERWINT.MOD

****

REGIONAL MODELING SYSTEM VERSION 3.2

DATA FILE SUMMARY

****

THE NAME OF THE DATA FILE IS: EMERWINT.MOD

THE STREAM NAME IS: Emerald Hill E.S. STP (High Flows)
THE RIVER BASIN IS: Rappahannock
THE SECTION NUMBER IS: 04
THE CLASSIFICATION IS: III

STANDARDS VIOLATED (Y/N) = N
STANDARDS APPROPRIATE (Y/N) = Y

DISCHARGE WITHIN 3 MILES (Y/N) = N

THE DISCHARGE BEING MODELED IS: Emerald Hill E.S. STP (Jan - May)

PROPOSED LIMITS ARE:
FLOW = .01 MGD
BOD5 = 30 MG/L
TKN = 30 MG/L
D.O. = 6 MG/L

'HE NUMBER OF SEGMENTS TO BE MODELED = 1

'Q10 WILL BE CALCULATED BY: FLOW COMPARISON
THE GAUGE NAME IS: Hazel River
GAUGE DRAINAGE AREA = 287 SQ.MI.
OBSERVED FLOW AT GAUGE = 47.8262 MGD
GAUGE 7Q10 = 47.8262 MGD
OBSERVED FLOW AT DISCHARGE = 3.2315 MGD

TREAM A DRY DITCH AT DISCHARGE (Y/N) = N
NTIDEGRADATION APPLIES (Y/N) = Y

LLOCATION DESIGN TEMPERATURE = 17.1 C

SEGMENT INFORMATION

####### SEGMENT # 1 #######

SEGMENT ENDS BECAUSE: THE MODEL ENDS

SEGMENT LENGTH = 4.6 MI

SEGMENT WIDTH = 15 FT
SEGMENT DEPTH = .75 FT
SEGMENT VELOCITY = .5 FT/SEC

DRAINAGE AREA AT SEGMENT START = 19.54 SQ.MI.
DRAINAGE AREA AT SEGMENT END = 29.47 SQ.MI.

ELEVATION AT UPSTREAM END = 320 FT
ELEVATION AT DOWNSTREAM END = 280 FT

THE CROSS SECTION IS: RECTANGULAR
THE CHANNEL IS: MODERATELY MEANDERING

POOLS AND RIFFLES (Y/N) = N

THE BOTTOM TYPE = SILT
SLUDGE DEPOSITS = NONE
AQUATIC PLANTS = NONE
ALGAE OBSERVED = NONE
WATER COLORED GREEN (Y/N) = N

****

REGIONAL MODELING SYSTEM Ver 3.2 (OWRM - 9/90)
6-07-1996 14:55:18

REGIONAL MODELING SYSTEM VERSION 3.2

MODEL SIMULATION FOR THE Emerald Hill Elementary School DISCHARGE

TO Muddy Run

CONMENT: Emerald Hill E.S. STP Summer (June - Dec)

THE SIMULATION STARTS AT THE Emerald Hill Elementary School DISCHARGE

********** PROPOSED PERMIT LIMITS **********

FLOW = .01 MGD cBOD5 = 10 Mg/L TKN = 10 Mg/L D.O. = 6 Mg/L

**** THE MAXIMUM CHLORINE ALLOWABLE IN THE DISCHARGE IS 0.288 Mg/L ****

'HE SECTION BEING MODELED IS 1 SEGMENT LONG
!ESULTS WILL BE GIVEN AT 0.1 MILE INTERVALS

********** BACKGROUND CONDITIONS **********

HE 7Q10 STREAM FLOW AT THE DISCHARGE IS 0.25200 MGD
HE DISSOLVED OXYGEN OF THE STREAM IS 7.423 Mg/L
HE BACKGROUND cBODu OF THE STREAM IS 5 Mg/L
HE BACKGROUND nBOD OF THE STREAM IS 0 Mg/L

********** MODEL PARAMETERS **********

SEG.	LEN. Mi	VEL. F/S	K2 1/D	K1 1/D	KN 1/D	BENTHIC Mg/L	ELEV. Ft	TEMP. C	DO-SAT Mg/L
1	4.60	0.271	5.217	1.000	0.350	0.000	300.00	25.00	8.248

'he K Rates shown are at 20 C ... the model corrects them for temperature.)

********** RESPONSE FOR S IT 1 **********

TOTAL STREAMFLOW = 0.2620 MGD
(Including Discharge)

DISTANCE FROM HEAD OF SEGMENT (MI.)	TOTAL DISTANCE FROM MODEL BEGINNING (MI.)	DISSOLVED OXYGEN (Mg/L)	cBODu (Mg/L)	nBODu (Mg/L)
0.000	0.000	7.369	5.763	1.157
0.100	0.100	7.314	5.602	1.143
0.200	0.200	7.271	5.445	1.130
0.300	0.300	7.237	5.293	1.117
0.400	0.400	7.212	5.144	1.104
0.500	0.500	7.194	5.000	1.092
0.600	0.600	7.182	5.000	1.079
0.700	0.700	7.302	5.000	1.067
0.800	0.800	7.408	5.000	1.054
0.900	0.900	7.423	5.000	1.042
1.000	1.000	7.423	5.000	1.030
1.100	1.100	7.423	5.000	1.018
1.200	1.200	7.423	5.000	1.006
1.300	1.300	7.423	5.000	0.995
1.400	1.400	7.423	5.000	0.983
1.500	1.500	7.423	5.000	0.972
1.600	1.600	7.423	5.000	0.961
1.700	1.700	7.423	5.000	0.950
1.800	1.800	7.423	5.000	0.939
1.900	1.900	7.423	5.000	0.928
2.000	2.000	7.423	5.000	0.917
2.100	2.100	7.423	5.000	0.906
2.200	2.200	7.423	5.000	0.896
2.300	2.300	7.423	5.000	0.886
2.400	2.400	7.423	5.000	0.876
2.500	2.500	7.423	5.000	0.865
2.600	2.600	7.423	5.000	0.855
2.700	2.700	7.423	5.000	0.845
2.800	2.800	7.423	5.000	0.836
2.900	2.900	7.423	5.000	0.826
3.000	3.000	7.423	5.000	0.817
3.100	3.100	7.423	5.000	0.807
3.200	3.200	7.423	5.000	0.798
3.300	3.300	7.423	5.000	0.789
3.400	3.400	7.423	5.000	0.780
3.500	3.500	7.423	5.000	0.771
3.600	3.600	7.423	5.000	0.762
3.700	3.700	7.423	5.000	0.753
3.800	3.800	7.423	5.000	0.744
3.900	3.900	7.423	5.000	0.736
4.000	4.000	7.423	5.000	0.727
4.100	4.100	7.423	5.000	0.719
4.200	4.200	7.423	5.000	0.710
4.300	4.300	7.423	5.000	0.702
4.400	4.400	7.423	5.000	0.694
4.500	4.500	7.423	5.000	0.686
4.600	4.600	7.423	5.000	0.678

****

REGIONAL MODELING SYSTEM Ver 3.2 (UNKM - 9/90)
06-07-1996 14:56:27

DATA FILE = EMER1.MOD

REGIONAL MODELING SYSTEM VERSION 3.2

DATA FILE SUMMARY

THE NAME OF THE DATA FILE IS: EMER1.MOD

THE STREAM NAME IS: Muddy Run
THE RIVER BASIN IS: Rappahannock
THE SECTION NUMBER IS: 04
THE CLASSIFICATION IS: III

STANDARDS VIOLATED (Y/N) = N
STANDARDS APPROPRIATE (Y/N) = Y

DISCHARGE WITHIN 3 MILES (Y/N) = N

THE DISCHARGE BEING MODELED IS: Emerald Hill Elementary School

PROPOSED LIMITS ARE:
FLOW = .01 MGD
BOD5 = 10 MG/L
TKN = 10 MG/L
D.O. = 6 MG/L

THE NUMBER OF SEGMENTS TO BE MODELED = 1

7Q10 WILL BE CALCULATED BY: FLOW COMPARISON
THE GAUGE NAME IS: HAZEL RIVER
GAUGE DRAINAGE AREA = 287 SQ.MI.
OBSERVED FLOW AT GAUGE = 3.68 MGD
GAUGE 7Q10 = 3.68 MGD
OBSERVED FLOW AT DISCHARGE = .252 MGD

TREAM A DRY DITCH AT DISCHARGE (Y/N) = N
NTIDEGRADATION APPLIES (Y/N) = Y

LLOCATION DESIGN TEMPERATURE = 25 C

SEGMENT INFORMATION

####### SEGMENT # 1 #######

SEGMENT ENDS BECAUSE: THE MODEL ENDS

SEGMENT LENGTH = 4.6 MI

SEGMENT WIDTH = 8 FT
SEGMENT DEPTH = .4 FT
SEGMENT VELOCITY = .2 FT/SEC

DRAINAGE AREA AT SEGMENT START = 19.54 SQ.MI.
DRAINAGE AREA AT SEGMENT END = 25 SQ.MI.

ELEVATION AT UPSTREAM END = 320 FT
ELEVATION AT DOWNSTREAM END = 280 FT

THE CROSS SECTION IS: RECTANGULAR
THE CHANNEL IS: MODERATELY MEANDERING

POOLS AND RIFFLES (Y/N) = N

THE BOTTOM TYPE = SILT
SLUDGE DEPOSITS = NONE
AQUATIC PLANTS = NONE
ALGAE OBSERVED = NONE
WATER COLORED GREEN (Y/N) = N

****

EGIONAL MODELING SYSTEM Ver 3.2 (OWRM - 9/90)
6-07-1996 14:58:00

Public Notice – Environmental Permit

PURPOSE OF NOTICE: To seek public comment on a draft permit from the Department of Environmental Quality that will allow the release of treated wastewater into a water body in Culpeper County, Virginia.

PUBLIC COMMENT PERIOD: XXX, 2011 to 5:00 p.m. on XXX, 2011

PERMIT NAME: Virginia Pollutant Discharge Elimination System Permit – Wastewater issued by DEQ, under the authority of the State Water Control Board

APPLICANT NAME, ADDRESS AND PERMIT NUMBER: County of Culpeper, 118 West Davis St, Ste 101, Culpeper, VA 22701, VA0089354

NAME AND ADDRESS OF FACILITY: Emerald Hill Elementary School, 11245 Rixeyville Rd, Culpeper VA 22701

PROJECT DESCRIPTION: The County of Culpeper has applied for a reissuance of a permit for the public Emerald Hill Elementary School Wastewater Treatment Plant. The applicant proposes to release treated sewage wastewaters from the elementary school at a rate of 0.01 million gallons per day into a water body. The sludge will be disposed by pump and haul to an approved facility. The facility proposes to release the treated sewage in the Muddy Run in Culpeper County in the Rappahannock watershed. A watershed is the land area drained by a river and its incoming streams. The permit will limit the following pollutants to amounts that protect water quality: pH, $CBOD_5$, BOD_5, Total Suspended Solids, TKN, Dissolved Oxygen, *E. coli,* and Total Residual Chlorine.

HOW TO COMMENT AND/OR REQUEST A PUBLIC HEARING: DEQ accepts comments and requests for public hearing by e-mail, fax or postal mail. All comments and requests must be in writing and be received by DEQ during the comment period. Submittals must include the names, mailing addresses and telephone numbers of the commenter/requester and of all persons represented by the commenter/requester. A request for public hearing must also include: 1) The reason why a public hearing is requested. 2) A brief, informal statement regarding the nature and extent of the interest of the requester or of those represented by the requestor, including how and to what extent such interest would be directly and adversely affected by the permit. 3) Specific references, where possible, to terms and conditions of the permit with suggested revisions. A public hearing may be held, including another comment period, if public response is significant, based on individual requests for a public hearing, and there are substantial, disputed issues relevant to the permit.

CONTACT FOR PUBLIC COMMENTS, DOCUMENT REQUESTS AND ADDITIONAL INFORMATION: The public may review the documents at the DEQ-Northern Regional Office by appointment, or may request electronic copies of the draft permit and fact sheet.
Name: Alison Thompson
Address: DEQ-Northern Regional Office, 13901 Crown Court, Woodbridge, VA 22193
Phone: (703) 583-3834 E-mail: alison.thompson@deq.virginia.gov Fax: (703) 583-3821

Revised 2/2003

State "Transmittal Checklist" to Assist in Targeting
Municipal and Industrial Individual NPDES Draft Permits for Review

Part I. State Draft Permit Submission Checklist

In accordance with the MOA established between the Commonwealth of Virginia and the United States Environmental Protection Agency, Region III, the Commonwealth submits the following draft National Pollutant Discharge Elimination System (NPDES) permit for Agency review and concurrence.

Facility Name:	Emerald Hill Elementary School
NPDES Permit Number:	VA0089354
Permit Writer Name:	Alison Thompson
Date:	October 6, 2011

Major [ ] **Minor** [X] **Industrial** [ ] **Municipal** [X]

I.A. Draft Permit Package Submittal Includes:	**Yes**	**No**	**N/A**
1. Permit Application?	X		
2. Complete Draft Permit (for renewal or first time permit – entire permit, including boilerplate information)?	X		
3. Copy of Public Notice?	X		
4. Complete Fact Sheet?	X		
5. A Priority Pollutant Screening to determine parameters of concern?	X		
6. A Reasonable Potential analysis showing calculated WQBELs?	X		
7. Dissolved Oxygen calculations?	X		
8. Whole Effluent Toxicity Test summary and analysis?			X
9. Permit Rating Sheet for new or modified industrial facilities?			X

I.B. Permit/Facility Characteristics	**Yes**	**No**	**N/A**
1. Is this a new, or currently unpermitted facility?		X	
2. Are all permissible outfalls (including combined sewer overflow points, non-process water and storm water) from the facility properly identified and authorized in the permit?	X		
3. Does the fact sheet **or** permit contain a description of the wastewater treatment process?	X		
4. Does the review of PCS/DMR data for at least the last 3 years indicate significant non-compliance with the existing permit?		X	
5. Has there been any change in streamflow characteristics since the last permit was developed?		X	
6. Does the permit allow the discharge of new or increased loadings of any pollutants?		X	
7. Does the fact sheet **or** permit provide a description of the receiving water body(s) to which the facility discharges, including information on low/critical flow conditions and designated/existing uses?		X	
8. Does the facility discharge to a 303(d) listed water?		X	
a. Has a TMDL been developed and approved by EPA for the impaired water?	X		
b. Does the record indicate that the TMDL development is on the State priority list and will most likely be developed within the life of the permit?			X
c. Does the facility discharge a pollutant of concern identified in the TMDL or 303(d) listed water?	X		
9. Have any limits been removed, or are any limits less stringent, than those in the current permit?		X	
10. Does the permit authorize discharges of storm water?		X	

I.B. Permit/Facility Characteristics – cont.	Yes	No	N/A
11. Has the facility substantially enlarged or altered its operation or substantially increased its flow or production?		X	
12. Are there any production-based, technology-based effluent limits in the permit?	X		
13. Do any water quality-based effluent limit calculations differ from the State's standard policies or procedures?	X		
14. Are any WQBELs based on an interpretation of narrative criteria?		X	
15. Does the permit incorporate any variances or other exceptions to the State's standards or regulations?		X	
16. Does the permit contain a compliance schedule for any limit or condition?		X	
17. Is there a potential impact to endangered/threatened species or their habitat by the facility's discharge(s)?		X	
18. Have impacts from the discharge(s) at downstream potable water supplies been evaluated?	X		
19. Is there any indication that there is significant public interest in the permit action proposed for this facility?		X	
20. Have previous permit, application, and fact sheet been examined?	X		

Part II. NPDES Draft Permit Checklist

Region III NPDES Permit Quality Checklist – for POTWs
(To be completed and included in the record only for POTWs)

II.A. Permit Cover Page/Administration	Yes	No	N/A
1. Does the fact sheet or permit describe the physical location of the facility, including latitude and longitude (not necessarily on permit cover page)?	X		
2. Does the permit contain specific authorization-to-discharge information (from where to where, by whom)?	X		

II.B. Effluent Limits – General Elements	Yes	No	N/A
1. Does the fact sheet describe the basis of final limits in the permit (e.g., that a comparison of technology and water quality-based limits was performed, and the most stringent limit selected)?	X		
2. Does the fact sheet discuss whether "antibacksliding" provisions were met for any limits that are less stringent than those in the previous NPDES permit?	X		

II.C. Technology-Based Effluent Limits (POTWs)	Yes	No	N/A
1. Does the permit contain numeric limits for ALL of the following: BOD (or alternative, e.g., CBOD, COD, TOC), TSS, and pH?	X		
2. Does the permit require at least 85% removal for BOD (or BOD alternative) and TSS (or 65% for equivalent to secondary) consistent with 40 CFR Part 133?	X		
a. If no, does the record indicate that application of WQBELs, or some other means, results in more stringent requirements than 85% removal or that an exception consistent with 40 CFR 133.103 has been approved?			X
3. Are technology-based permit limits expressed in the appropriate units of measure (e.g., concentration, mass, SU)?	X		
4. Are permit limits for BOD and TSS expressed in terms of both long term (e.g., average monthly) and short term (e.g., average weekly) limits?	X		
5. Are any concentration limitations in the permit less stringent than the secondary treatment requirements (30 mg/l BOD5 and TSS for a 30-day average and 45 mg/l BOD5 and TSS for a 7-day average)?		X	
a. If yes, does the record provide a justification (e.g., waste stabilization pond, trickling filter, etc.) for the alternate limitations?			X

II.D. Water Quality-Based Effluent Limits	Yes	No	N/A
1. Does the permit include appropriate limitations consistent with 40 CFR 122.44(d) covering State narrative and numeric criteria for water quality?	X		
2. Does the fact sheet indicate that any WQBELs were derived from a completed and EPA approved TMDL?	X		
3. Does the fact sheet provide effluent characteristics for each outfall?	X		
4. Does the fact sheet document that a "reasonable potential" evaluation was performed?	X		
a. If yes, does the fact sheet indicate that the "reasonable potential" evaluation was performed in accordance with the State's approved procedures?	X		
b. Does the fact sheet describe the basis for allowing or disallowing in-stream dilution or a mixing zone?	X		
c. Does the fact sheet present WLA calculation procedures for all pollutants that were found to have "reasonable potential"?	X		
d. Does the fact sheet indicate that the "reasonable potential" and WLA calculations accounted for contributions from upstream sources (i.e., do calculations include ambient/background concentrations)?	X		
e. Does the permit contain numeric effluent limits for all pollutants for which "reasonable potential" was determined?	X		

II.D. Water Quality-Based Effluent Limits – cont.	Yes	No	N/A
5. Are all final WQBELs in the permit consistent with the justification and/or documentation provided in the fact sheet?	X		
6. For all final WQBELs, are BOTH long-term AND short-term effluent limits established?	X		
7. Are WQBELs expressed in the permit using appropriate units of measure (e.g., mass, concentration)?	X		
8. Does the record indicate that an "antidegradation" review was performed in accordance with the State's approved antidegradation policy?	X		

II.E. Monitoring and Reporting Requirements	Yes	No	N/A
1. Does the permit require at least annual monitoring for all limited parameters and other monitoring as required by State and Federal regulations?	X		
a. If no, does the fact sheet indicate that the facility applied for and was granted a monitoring waiver, AND, does the permit specifically incorporate this waiver?			
2. Does the permit identify the physical location where monitoring is to be performed for each outfall?	X		
3. Does the permit require at least annual influent monitoring for BOD (or BOD alternative) and TSS to assess compliance with applicable percent removal requirements?		X	
4. Does the permit require testing for Whole Effluent Toxicity?		X	

II.F. Special Conditions	Yes	No	N/A
1. Does the permit include appropriate biosolids use/disposal requirements?	X		
2. Does the permit include appropriate storm water program requirements?			X

II.F. Special Conditions – cont.	Yes	No	N/A
3. If the permit contains compliance schedule(s), are they consistent with statutory and regulatory deadlines and requirements?			X
4. Are other special conditions (e.g., ambient sampling, mixing studies, TIE/TRE, BMPs, special studies) consistent with CWA and NPDES regulations?	X		
5. Does the permit allow/authorize discharge of sanitary sewage from points other than the POTW outfall(s) or CSO outfalls [i.e., Sanitary Sewer Overflows (SSOs) or treatment plant bypasses]?		X	
6. Does the permit authorize discharges from Combined Sewer Overflows (CSOs)?		X	
a. Does the permit require implementation of the "Nine Minimum Controls"?			X
b. Does the permit require development and implementation of a "Long Term Control Plan"?			X
c. Does the permit require monitoring and reporting for CSO events?			X
7. Does the permit include appropriate Pretreatment Program requirements?			X

II.G. Standard Conditions	Yes	No	N/A
1. Does the **permit** contain all 40 CFR 122.41 standard conditions or the State equivalent (or more stringent) conditions?	X		

List of Standard Conditions – 40 CFR 122.41

Duty to comply	Property rights	Reporting Requirements
Duty to reapply	Duty to provide information	Planned change
Need to halt or reduce activity not a defense	Inspections and entry	Anticipated noncompliance
	Monitoring and records	Transfers
Duty to mitigate	Signatory requirement	Monitoring reports
Proper O & M	Bypass	Compliance schedules
Permit actions	Upset	24-Hour reporting
		Other non-compliance

2. Does the permit contain the additional standard condition (or the State equivalent or more stringent conditions) for POTWs regarding notification of new introduction of pollutants and new industrial users [40 CFR 122.42(b)]?	X		

Part III. Signature Page

Based on a review of the data and other information submitted by the permit applicant, and the draft permit and other administrative records generated by the Department/Division and/or made available to the Department/Division, the information provided on this checklist is accurate and complete, to the best of my knowledge.

Name	Alison Thompson
Title	Water Permits Technical Reviewer
Signature	
Date	10/6/11